Exploring Factors Implicated in Secure Psychiatric Inpatient Weight Gain and Obesity

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Submitted to Cardiff Metropolitan University in fulfilment of the requirements for the Degree of Doctor of Philosophy

Cardiff Metropolitan University
December 2021

Abstract

People who have serious mental illness experience greater levels of early mortality compared to their mentally healthy counterparts (Chesney, Goodwin & Fazel, 2014). This early death is largely attributed to physical illnesses that are associated with obesity. Individuals who have serious mental illness and who are treated in secure psychiatric hospitals experience significant increases in their weight upon admission. Several factors predispose people with serious mental illness to weight gain and obesity. This thesis explored the factors that mediate weight gain and obesity maintenance in secure psychiatric inpatients. Study 1 used routine patient data to explore changes in body weight following admission into secure services. This established that patient's body weight on admission was a significant predictor of weight gain over the first twelve weeks of secure inpatient treatment. Study 2 explored the influence of cognitive factors known to influence eating behaviour, the data demonstrated that although the patient group displayed attentional bias to food cues this was not predictive of weight gain. Levels of emotional and disinhibited eating were associated with weight gain over 3 months. Study 3 explored psychological predictors of weight gain; it was found that anxious-preoccupied attachment style was associated with weight gain over 6 months. Study 4 explored staff member's views on how the secure psychiatric environment impacts on patient weight gain and obesity. A thematic analysis highlighted 5 themes: secure service culture, food culture, poor diet versus lack of physical activity, poor mental health, and weight management initiatives. The results of this thesis are discussed in terms of theoretical perspectives of psychological factors and the wider implications for understanding secure psychiatric inpatient obesity.

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Acknowledgements

I would like to express my sincere gratitude to the many people who supported me throughout the process of this thesis. Firstly, to KESS for making it possible for me to conduct this thesis. To my supervisory team; Dr Heidi Seage, for your time, guidance, and continuous support throughout the whole process. Thank you for always having my back. Dr Ruth Bagshaw, for always being straight with me, for your patience and for always going the extra mile to get me where I want to be in my career. Dr Andy Watt and Dr Paul Hewlett for providing me with your expert advice on particular aspects of this thesis.

To my family I would like to thank you for your support, both emotional and financial (mainly financial, thanks Dad). For listening to me talk about my thesis and having no idea what I am talking about, but asking questions nonetheless. A special thanks to my parents, Rebecca and Chris, my brother and sister-in-law Adam and Lauren, and my aunt and uncle, John and Liz. My friends, who are really more like family, for allowing me the space to decompress and ramble (largely incoherent) things at you after days of writing this thesis. Particular shout outs to Aqib, Imran, Ishaan, Jake, Jay, Keri, Ruhul, Toby, and Tomo.

To my love and best friend, Mollie, for being so genuinely interested in my thesis and other passions. Your love and encouragement over the past few months have been invaluable, I really wouldn't have wanted to share the completion of this thesis with anyone else.

Finally, to the patients and staff members who took part in the studies included in this thesis. This work would not have been possible if it was not for your time and for that I am truly grateful.

Research Publications and Conference Presentations

- Davies, J., Seage, H., Watt, A., Hewlett, P., & Bagshaw, R. (2017, December). Investigating psychological factors in the relationship between antipsychotic drugs and obesity in a secure service in-patient population. *Quality Network for Forensic Mental Health Services newsletter (Winter)*, 24-25.

- Davies, J., Hewlett, P., Seage, H., Watt, A., Bagshaw, R., & Hill, C. (2018). Weight gain in secure psychiatric settings: The role of psychological factors in the mediation of obesity. *Appetite*, *130*, 302. doi: 10.1016/j.appet.2018.05.177. *Poster presented at the British Feeding and Drinking Group Meeting (BFDG)*. Lyon, France, March 2018.

- Davies, J., Seage, H., Bagshaw, R.., Hewlett, P., Watt, A. (2019, Spring). What causes weight gain in secure psychiatric inpatients. *International Association for Forensic Mental Health Services newsletter*, 7-8.

- Davies, J., Seage, H., Watt, A., Hewlett, P., Bagshaw, R., Deslandes, P., & Hill, C. (2019). Weight gain in secure psychiatric settings: the role of routinely collected clinical measures in the mediation of obesity. *Poster presented at the International Association for Forensic Mental Health Services conference (IAFMHS)*. Montreal, Canada, August 2019.

- Davies, J., Seage, H., Watt, A., Hewlett, P., Bagshaw, R., & Deslandes, P. (2020). Weight gain in psychiatric inpatients was unrelated to medication, treatment duration or sociodemographic factors. *Appetite, 151, 104336. Abstract of the paper presented at 43rd British Feeding and Drinking Group Meeting (BFDG).* Swansea, Wales, March 2019.

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Abbreviations

AAI	Adult Attachment Interview
ABMUHB	Abertawe Bro Morgannwg University Health Board
ACE	Adverse Childhood Experiences
ACE-Q	Adverse Childhood Experiences Questionnaire
ACT	Acceptance and Commitment Therapy
AFE	Adverse Family Experiences
APA	American Psychological Association
ANT	Attention Network Test
BEAQ	Brief Experiential Avoidance Questionnaire
BED	Binge-Eating Disorder
BMI	Body Mass Index
CHD	Coronary Heart Disease
DGI	Delayed Gratification Inventory
DSM	**Diagnostic and Statistical Manual of Mental Disorders**
DV	**Dependent Variable**
ESP	Extrapyramidal Side-Effects
fMRI	Functional Magnetic Resonance Imaging
HCRW	Health Care Research Wales
ICD	**International Classification of Diseases**
IRAS	Integrated Research Application System
KESS	Knowledge Economy Skills Scholarship
kg	Kilograms
m	Metres
MEAQ	Multidimensional Experiential Avoidance Questionnaire
MH	Mental Health
ms	Milliseconds
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
ANVOA	Analysis of Variance
PA	Physical Activities
PD	Personality Disorder
PICU	Psychiatric Intensive Care Unit
RC	Responsible Clinician
RQ	Relationship Questionnaire
RT	Reaction Time
R&D	Research and Development Department
SD	Standard Deviation
SMI	Serious Mental Illness
SPSS	Statistical Package for Social Sciences
SSRI	Selective Serotonin Reuptake Inhibitors
T	Transcript
TCA	Tricyclic Antidepressants

TFEQ	Three Factor Eating Questionnaire
TFEQ-R18	Three Factor Eating Questionnaire-Revised 18 scale
TFEQ-R18-E	Three Factor Eating Questionnaire Emotional Eating Scale
TFEQ-R18-R	Three Factor Eating Questionnaire Restraint Eating Scale
TFEQ-R18-U	Three Factor Eating Questionnaire Uncontrolled Eating Scale
VAS	Visual Analogue Scale
VDP	Visual Dot Probe Task
WHO	World Health Organisation
UHB	University Health Board

Chapter 1: Background

1.1 Serious Mental Illness: Mortality and Co-Morbidities

Serious mental illness (SMI) is defined as a mental, behavioural, or emotional disorder resulting in serious functional impairment(s) which substantially interferes with, or limits one or more major life activities (Wang, Demler & Kessler, 2002). In the UK, 0.9% of the population have an SMI diagnosis (Public Health England, 2018). People with SMI have a high risk of premature death (Harris & Barraclough, 1998; Laursen, Munk-Olsen & Vestergaard, 2012; Ösby, et al., 2000; Saha, Chant & McGrath, 2007). On average individuals with SMI have a 10-25-year reduced average life expectancy compared to the general population (Chesney, Goodwin & Fazel, 2014; Laursen, Munk-Olsen & Vestergaard, 2012). Whilst many of these premature deaths are explained by suicide (30-80%; Knipe et al., 2019), the proportion of the deaths attributed to unnatural causes such as suicide, has been reducing over the past few decades (Nielson et al., 2020). For example, in the UK, psychiatric inpatient suicide rates decreased by 60% between 2004 and 2014 (Appleby et al., 2016). Mortality data for this population indicates that worldwide there are increasing numbers of deaths attributed to natural causes (Nielson et al., 2020). Reduced life expectancy of people with SMI is principally the result of avoidable physical illnesses (Hennekens et al., 2005; Laursen, Munk-Olsen & Vestergaard, 2012; Subashini et al., 2011; Zareifopoulos et al., 2018; Zolezzi et al., 2017). In the UK, it is estimated that 67% of deaths for people with SMI can be attributed to acute or chronic physical illness (Public Health England, 2018).

Multi-morbidity of physical illness is common amongst those diagnosed with SMI (Gray, Hughes & Bressington, 2016). People with SMI have a two-fold increased risk of

death due to coronary heart disease (CHD; Hennekens et al., 2005). They also have a three-fold increased risk of having metabolic syndrome, a condition characterised by the presence of diabetes, high blood pressure and obesity (Tay, Nurjono & Lee, 2013). People with SMI are 1.5 times more likely to suffer from comorbid chronic obstructive pulmonary disease compared to the general population (Zareifopoulos et al., 2018). There is also an increased prevalence of type II diabetes, hypertension, hyperlipidaemia and thyroid abnormalities (Subashini et al., 2011; Zolezzi et al., 2017). A significant risk factor for many of the chronic illnesses outlined above is obesity (Gray, Hughes & Bressington, 2016; Subashini et al., 2011; Verberne et al., 2017; Zolezzi et al., 2017). There is a high incidence of obesity in those with SMI and amongst people who experience mental health problems more generally (Annamalai, Kosir & Tek, 2017; Bodenlos et al., 2011; Donnadieu-Rigole et al., 2016; Petry et al., 2008) which may explain multi-morbidity within this population.

Obesity is commonly measured by an individual's body mass index (BMI). Body Mass Index is a value calculated from the division of the individuals body weight in kilograms by the square root of their body height (kg/m^2). A healthy BMI is generally considered between 18.5 to 24.9 kg/m^2. Overweight classification stands at a BMI score between 25 to 29.9kg/m^2. The World Health Organisation (WHO; 2020) suggest there is an increased risk of physical health comorbidities at this body weight. A moderate to severe risk of co-morbidities is seen when BMI classification is greater than 30kg/m^2 (within the obese range). For clinical purposes, obesity is further sub-categorised as obesity class I (low risk; 30 - 34.9kg/m^2), obesity class II (moderate risk; 35 - 39.9kg/m^2) and obesity class III (high risk; 40>kg/m^2) (National Health Service; NHS, 2020). Individuals with SMI are more likely to be obese than the general population, with studies reporting between 53% of those with schizophrenia and

55% of people with bipolar disorder having a BMI of 30kg/m^2 or above (Correll et al., 2010), compared to 13% for the general population (WHO, 2020).

It is important to acknowledge the onset of many of these chronic conditions associated with SMI have also been attributed to inequality in health or social care provision (Dregan et al., 2020; Laursen, Munk-Olsen & Vestergaard, 2012). In terms of health care inequalities, it has been noted that those with SMI face reduced access to and uptake of health care services, experience treatment disparities for physical health conditions and have reduced engagement in health screening. These disparities are thought to be a consequence of diagnostic overshadowing (Dregan et al., 2020; Laursen, Munk-Olsen & Vestergaard, 2012). These inequalities reflect the myriad of socioeconomic barriers faced by those with SMI, that which are themselves detrimental to physical and mental health. These factors include social deprivation, poverty, isolation, and experiences of stigmatisation (Dregan et al. 2020).

There is growing evidence of the deleterious health effects of loneliness on mortality (Shevlin et al., 2013; Tanskanen & Anttila, 2016), which is a concern as people with SMI are at very high risk of isolation and social exclusion (Morgan et al., 2007; Perese & Wolf, 2005). This challenging socioeconomic context is likely to influence engagement with harmful lifestyle behaviours; Cockerham's (2005) health lifestyle theory proposes that the social context is as influential to the adoption of health harming behaviours as individual agency. Dregan et al. (2020) proposed that unhealthy lifestyle behaviours such as smoking, sedentary behaviour and poor diet appear to carry the greatest mortality risk for this group, and that addressing health behaviours could increase life expectancy in people with SMI by four to seven years.

1.2 Obesity in Secure Psychiatric Inpatient Services

Secure psychiatric services are facilities that aim to treat patients with SMI who pose a danger to themselves and/or others, or present with behaviours that challenge in non-secure mental health settings (NHS confederation, 2012). Some patients will be placed in a secure psychiatric service as they have committed a criminal offence (Kennedy 2002). Treatment is primarily in the form of medical, nursing, psychological, social, education, vocational rehabilitation, and intervention (Tirupati & Chua, 2007). In the UK, patients can be placed in low, medium, or high secure psychiatric services, depending on their risks and needs. These services form a pathway of secure mental health care for a small minority of patients who pose the highest risks or who are subject to criminal sanctions that require them to be detained within a secure perimeter. According to the Centre for Mental Health (2011) there is an estimated 7,000 – 8,000 secure psychiatric inpatients in the UK.

Psychiatric intensive care units, or PICU, are another type of psychiatric inpatient service which is typically used for short term management of acute agitation and aggression for patients who are detained under the Mental Health Act (1983), who would otherwise be accommodated on an acute inpatient ward. Psychiatric Intensive Care Units differ from other secure services; for example, low secure services provide longer term care for patients with chronic and often complex mental illnesses that cannot be successfully and safely cared for in acute or rehabilitation inpatient settings (NHS confederation, 2012). Secure inpatients assessed level of risk of harm to self or others is typically higher than those in an acute general inpatient setting; and individuals are usually detained under the Mental Health Act (1983; NHS confederation, 2012). Much like low secure services, medium secure services offer care for adults with SMI (NHS confederation, 2012). Patients are usually placed in medium secure services from court or, as part of an integrated care-pathway, and

transferred from high secure to medium secure, or in some scenarios, from low secure to medium secure (NHS confederation, 2012). As one might expect, high secure services exist to care for those whose risk is considered unmanageable in services of low or medium security. High secure services in the UK are designed for those patients whose offence (and/or related media profile) is such that it is deemed necessary either in the interests of justice, or the patient's own safety, to impose the highest possible levels of physical and procedural security.

Recent statistics reported that globally, between 16 - 74% of secure psychiatric inpatients are classified as obese according to the WHO definition (Day & Johnson, 2017; Huthwaite et al., 2017; Mat et al., 2014; Shin et al., 2012). There is a lack of recent data documenting the scale and severity of obesity in secure inpatient populations both worldwide and in the UK. Within published literature the mean BMI for secure inpatients ranges between 26.3 - 35.2kg/m^2 (Every-Palmer et al., 2018; Hilton et al., 2015; Huthwaite et al., 2017; Long et al., 2013; Mat et al., 2014; Tirupati & Chua, 2007). However, only one of these studies was conducted in the UK (Long et al., 2013), and in this population the average BMI was in the overweight range (27.3kg/m^2). In 2017, The Department of Health published a 'Call to Action' paper, which highlights the challenges of managing rising obesity rates within secure services (Day & Johnson, 2017). This was followed by the National Institute for Health and Care Excellence (NICE) shared learning database which was published in 2018. This database aimed to support health professionals to improve the physical health for people with SMI. This builds upon clinical guidelines for the management of psychosis and schizophrenia, which have recommended annual physical health checks since their publication in 2014 (NICE, 2014a). Despite there being clear clinical guidance on the management of physical health in secure settings the extent to which these are incorporated

in practice is unclear; for example a systematic review by Happel et al. (2012) indicates that within secure services there are few interventions to improve the physical health of patients. Historically within the UK there has been a reduced focus on the physical health needs of patients in secure settings and this may be because individuals are primarily admitted into the service for treatment of their mental health (Happell et al., 2012). It is only recently that research has been conducted within secure psychiatric settings and so it is plausible that methods for collecting data on physical health outcomes within these settings are inconsistent (Day & Johnson, 2017). This may have significant implications for patients, as obesity can exacerbate mental ill health and also lead to premature death.

Although there has been limited attempts to document the reasons that influence weight gain in secure settings; the existing evidence base identifies several factors that create obesity risk in populations with SMI. For example, commencement of antipsychotic medication is associated with significant weight gain, with the first weeks of treatment being a period where rapid weight gain is likely (Wetterling, 2006). Similar trends are seen in patients who are newly admitted as psychiatric inpatients. A recent study of secure psychiatric inpatients from New Zealand, 47.2% of people who were admitted into the service gained over 5kg in body weight in the first 12 weeks following admission (Every-Palmer et al., 2018). The risk of weight gain may continue past this initial 12-week period, (Hilton et al., 2015). When Hilton (2015) documented weight gain in an inpatient sample (n = 122); 52% of participants were either overweight or obese on admission. The proportion of patients who were overweight increased to 68% on discharge (mean length of stay = 27 weeks). Hilton et al. (2015) found that the average weight gain across their sample (n = 122) was 8.7kg. The study found that weight gain was not predicted by diagnosis, antipsychotic medication or adherence to medication, which illustrates that there is a limited understanding

of the reasons why excessive weight gain is a common feature of secure psychiatric inpatient settings. An important caveat to consider when reviewing research into patient weight changes is that there are inherent methodological difficulties in establishing reliable retrospective estimates of weight gain across inpatient samples; for example researchers indicated that there is often limited routine information collected on patients weight (Every-Palmer et al. 2018; Hilton et al. 2015).

It is plausible that an individual with SMI begins to experience changes to their body weight prior to hospital admission; as many psychotropic medications prescribed to treat newly diagnoses SMI are associated with weight gain (Alma et al., 1999; Leucht et al., 2013). The National Institute for Health and Care Excellence (2014) state that medication prescribed for SMI should be a shared decision between patient and the prescribing clinician, and that physical health needs should be considered alongside treatment options (NICE, 2014a). Specifically, these guidelines state that baseline physical health investigations (i.e., weight, waist circumference) should be conducted prior to commencing medication. The association between psychotropic medication and weight gain is explored in greater detail in Chapter 2 (section 2.5.3).

Akin to the general population, psychiatric patients are likely to gain weight if they engage in lifestyle behaviours that promote obesity (Simon et al., 2006). A combination of inactive lifestyle and overeating, coupled with the side effects of antipsychotic medication means that it is plausible that many individuals with SMI experience issues with weight gain even if they are not admitted for inpatient care. This is supported by data that indicates that many individuals are overweight prior to their admission to secure services (Hilton et al., 2015; Shin et al., 2012). However, the prevalence of obesity within secure settings remains

higher than what has been documented in community settings (Hilton et al., 2015; Shin et al., 2012). Therefore, it is likely that obesity risk within secure psychiatric services is promoted by a combination of the obesogenic characteristics of the population, the secure environment, and the side effects of psychotropic medication.

1.3 Aims of the Thesis

This thesis explores if factors that are associated with weight gain in the non-forensic literature (such as SMI, pharmacological treatment for SMI, cognition and the psychiatric hospital environment), are associated with weight gain in Welsh secure psychiatric services. This thesis was funded by a Knowledge Economy Skills Scholarship (KESS-II) project. The Knowledge Economy Skills Scholarship is a European Social Fund supported scholarship that allows collaborative research projects between organisations and the Higher Education sector to take place. As such, KESS-II funded candidates are required to complete their research within the partner organisation. The research included in this thesis is conducted within three Welsh secure psychiatric inpatient services on inpatients and staff members and includes three distinct work packages. A summary of what is included in each of the following Chapters is included below.

1.3.1 Structure of the Thesis

The current thesis is inclusive of an extensive review of literature (Chapter 2), a summary of the general methodology employed in this thesis (Chapter 3), three work packages (Chapters 4, 5, 6 and 7) and a discussion about the findings of these work packages (Chapter 8). The literature review explores the prevalence of obesity within secure psychiatric care, as well as access to food within secure settings. From this, an exploration of cognitive and

clinical psychological factors that have been implicated in obesity more generally, and in some cases within secure care, is conducted. Following this literature review, Chapter 3 includes general methodological and ethical considerations, and common measures used within the work packages.

The first work package (Chapter 4) in this thesis presents an audit of routine data that is collected in relation to physical and mental health within secure settings (Study 1). More specifically, this study explores the prevalence of weight gain within three Welsh secure psychiatric services. Weight gain, particularly over the initial stages of inpatient treatment, has been documented as highly prevalent amongst secure psychiatric populations and so it is expected that this will also be the case within Welsh secure services. The evidence reviewed in Chapter 2 clearly proposes that mental illness, pre-existing substance misuse, institutionalisation, and medication are all implicated in psychiatric inpatient weight gain. The study in Chapter 4 aims to explore whether these factors are able to explain weight gain in a population of Welsh secure inpatients over the first 12-weeks of admission.

The second work package (Chapters 5 and 6) aims to extend these findings and explores the relative contribution that cognitive, appetitive and clinical-psychological factors have on inpatient weight gain. This work package includes two studies. Research shows that an attentional bias towards food cues is associated with overconsumption of food. This is exacerbated when individuals have dysregulated eating traits. The first of these studies (Chapter 5) examines whether the pull of food stimuli, and dysregulated eating behaviour influence Welsh secure inpatient weight gain over a six-month period. Research has also suggested that psychological features such as attachment style, exposure to early trauma and the resulting psychological inflexibility are implicated in obesity. With this in mind, the

second study (Chapter 6) in work package 2 investigates whether attachment style, Adverse Childhood Experiences (ACEs) and experiential avoidance predict weight gain in Welsh secure inpatients over a six-month period. Data for both study 2 (Chapter 5) and 3 (Chapter 6) were conducted at the same time from the same pool of participants, however, due to the small sample size they have been split into two separate analyses.

The third and final work package (Chapter 7), aims to build on research that proposes the secure psychiatric physical and cultural environment itself is involved in inpatient weight gain and obesity. This study involves interviews with staff members from a number of different professions, namely: health care support work, nursing, medical, psychology, social work and occupational therapy. The study explores their views on what factors, if any, may be contributing to patient's weight gain and obesity. The final chapter in this thesis (Chapter 8) summarises findings from each of the three work packages (Chapters 4, 5, 6 and 7). It also provides implications for practice, future directions for research and limitations of the thesis.

Chapter 2: Literature Review

2.1 The Secure Service Environment

The secure psychiatric inpatient setting has been described as obesogenic (Day & Johnson, 2017). This term is used to describe an environment that promotes unhealthy eating habits and obesity (Lake and Townsend, 2006). Factors that contribute to an obesogenic environment include the influence of the physical or built environment, the organisational culture and accessibility of high calorie foods. In the context of secure psychiatric services there are several key reasons why the environment may be considered obesogenic. For example, patients have restricted access to the outside world, which promotes sedentary behaviour.

Secure services exist to protect the patients and the public and to offer immersive treatment for people who have committed offences in the context of poor mental health (Kennedy, 2002). Patients are not permitted to leave the hospital without permission from their responsible clinician, or in cases where patients are detained under restricted sections of the Mental Health Act, the Ministry of Justice (Kennedy, 2002). There are varying degrees of leave that can be granted to patients, from leave within the grounds of the hospital, to unescorted leave within the community (Kennedy, 2002). Unfortunately, for many patients their mental ill-health or perceived risk is such that they are not granted leave. Opportunities to engage in physical activity is limited within secure settings and many patients have sedentary lifestyles; there are few opportunities for patients to exercise is via the onsite gym, however, gym attendance is reliant on staff availability which can be problematic as many secure services are understaffed (Rabab, Tomlin, Huband & Völm, 2020; Rimmer, 2018).

The secure environment may be particularly challenging for newly admitted patients. A new patient will have heighted restriction in terms of leave (for example they may be confined to their unit or hospital grounds for the first few weeks or months of their stay in hospital). It is known from the literature reviewed in Chapter 1 (section 1.2) that newly admitted inpatients are at a greater risk of weight gain and the lack of access to physical activity may be contributing to this pattern of weight gain (Oakley et al., 2013). However, it is important to acknowledge that for many individuals it may not necessarily be a lack of opportunity to access physical activity facilities that is precipitating their sedentary behaviour; rather it may be that motivation to engage in physical activities is low (Day & Johnson, 2017). Low motivation is exacerbated by poor mental health (Firth et al., 2016).

Alongside restrictions on physical activity, the secure setting also restricts individuals' access to pleasures associated with the outside world (e.g., social support, alcohol, leisure activities). For secure patients there is limited opportunity to engage in pleasurable activity such as socialising with loved ones or taking part in leisure activities and hobbies. As such a particularly accessible way for a patient to achieve feelings of pleasure in a restricted setting is to consume foods that are high in fat and sugar (Mogg et al., 1998). It is not known how many individuals use food for reward or comfort within a secure setting, however, hedonic eating is common in the general population and is associated with frequent overeating (Horwath, Hagmann & Hartmann, 2020). It is known that individuals with poor mental health or those who have experienced traumatic early life experiences commonly use food as a means of comfort (Felitti et al., 1998; Litwin et al., 2016; Ross, 2009).

2.2 Access to Food within Secure Settings

A review conducted by Day and Johnson (2017) highlights many patients in secure services self-report diets that have poor nutritional value. Within secure settings there is often access to an array of unhealthy snack foods; in one secure setting patients were found to have purchased 326 individual takeaways over 21 days (Kasmi, 2009). Annual costs of takeaway foods for this unit were estimated at £727 per patient, with an overall unit cost of £47,423. The generalisability of Kasmi's (2009) work to other secure settings is limited, as the report contains limited methodological detail making it difficult to establish how many patients were included the sample. Furthermore, these data are also likely to underrepresent how many individuals ordered takeaway food, as many orders reported were group orders.

Although many secure settings in the UK prohibit patients from ordering food from external settings (such as takeaways) most do have their own shop which sell food items. Such shops are used as a platform for patients to gain valuable occupational or vocational experience. A significant portion of the shops stock is often made up of high calorie foods with limited products sold that are fresh, or low calorie (Harper, Ferriter & Cormac, 2008). Harper, Ferriter and Cormac (2008) report that 26% of the stock of one inpatient "shop" were foods classed as snack foods that had low nutritional value (e.g., sweets, crisps, and chocolate). A similar study by Long et al. (2009) noted that individuals purchased significantly more crisps, chocolate and sweets in the patient shop compared to fruit.

Currently there is food standards established for Welsh secure services, however, services in England must adhere to food standards set out by Public Health guidance and this should mean that meals have good nutritional values (Public Health England, 2021). A government task and finish group called "Managing a Healthy Weight" has recently published specific

guidance for secure services on how to create environments that promote healthy lifestyles and reduce obesity (Public Health England, 2021). These guidelines highlight ways that services, staff members, families, friends, and the patients themselves can improve patient's physical health and diet during their stay in hospital. These standards go beyond simply offering healthy and nutritious food during mealtimes and proposes that all services should also offer nutrition assessments for patients on admission.

According to the guidance from the Department of Health (2000), the menu offered within the setting should be regularly checked by dieticians. However, observation data from a study within a high secure service in the UK highlighted that most patient consumed meals that had higher than recommended calorie content (Long et al., 2009). Patients were also able to request second helpings (Long et al., 2009). As patients have autonomy and can choose their meals based on their personal preferences; this can result in meals being consumed that contained higher than the recommended levels of carbohydrates and fats (Long et al., 2009). The authors also reported that sugar intake was higher than recommended guidance, as although menus may offer food choices that are low in sugar, around 60% of patients had multiple teaspoons of sugar in hot drinks and consumed at least two carbonated drinks a day. This study also collected patients' perspectives of the foods offered within their service and found that patients felt that dinner was served too early (5pm) which led to snacking in the evening. As patients had unrestricted access to the foods bought in the onsite snack shop and those that had been brought into the service from visitors. Although Long et al's. (2009) work provides a snapshot of the eating patterns of patients in one secure setting, it is clear that weight gain in this patient group was a consequence of the high calorie meals served by the service, frequent snacking behaviour and inactivity. The generalisability of these findings to other secure settings is supported by Moholokar (2017, p.2) who highlighted that within

secure services there are inconsistent mealtimes, and variation in policies surrounding take away meals and access to unhealthy food and drinks options.

2.2.1 Summary

- Secure psychiatric inpatients have high incidences of obesity.
- Newly admitted patients are particularly vulnerable to weight gain
- Weight gain within the secure psychiatric environment is influenced both by restrictive nature of the environment but also the types of food that are available within these settings.

2.3 Conceptualising Weight Gain in a Secure Setting

The aetiology of weight gain is complex, and there are a range of factors that may influence appetitive responses in those with SMI which to date have been overlooked. This literature review aims to provide an in-depth exploration of the key clinical and psychological factors that may influence weight gain in secure populations (see Figure 2.1). An integrative biopsychosocial perspective is needed to understand obesity (Rosenabaum & White, 2016); the reasons why individuals gain weight within secure settings are multifaceted and are likely to reflect the complex interplay between biological, psychological, and social factors (Figure 2.1).

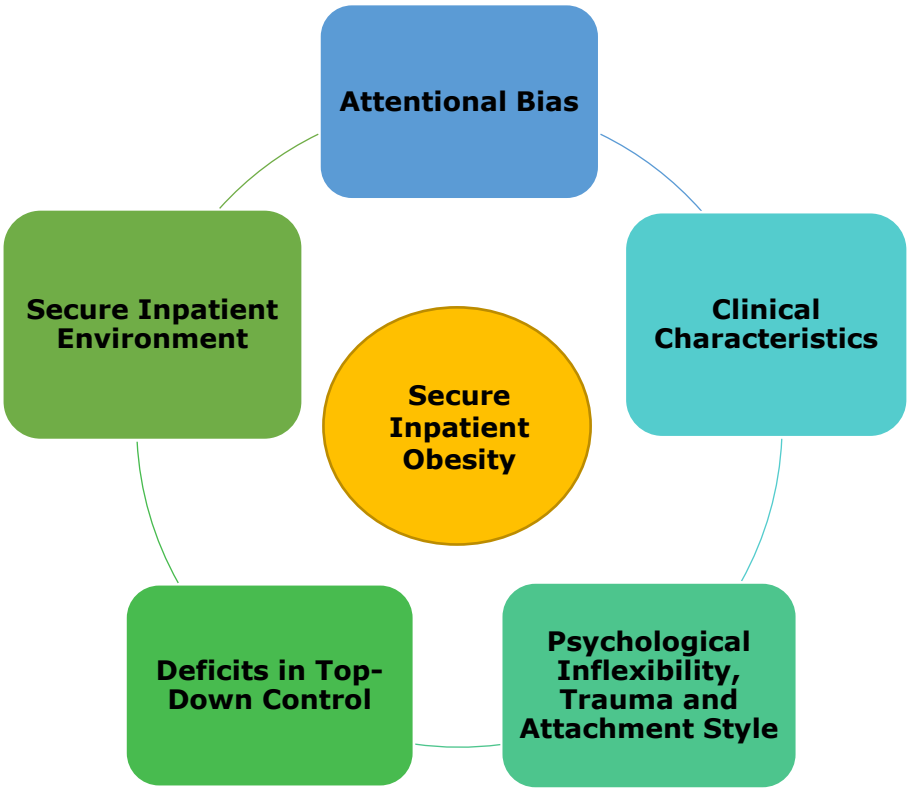

Figure 2.1 Type of influencers explored in review.

High calorie foods (and their cues) are ubiquitous within secure environments (Hagan et al., 2020), from a cognitive perspective and individual differences in responsivity to these cues may explain variability in weight gain risk (Hagan et al., 2020; Hendrikse et al., 2015; Schultes et al., 2010; Seage & Lee, 2017; Ulrich et al., 2013). Individuals with SMI share clinical characteristics that may make them vulnerable to dysfunctional eating patterns (e.g., binge eating, emotional eating) and these behaviours are thought to reflect deficits in inhibition and impulse control (Cuntz et al., 2001; Marcus et al., 1990; Riener, Schindler & Ludvik, 2006; Yanovski et al., 1993).

Dysfunctional eating patterns can reflect and individuals tendency to use food as a coping mechanism for processing emotional turmoil (Anderson et al., 2012; Anderson & Whitaker, 2011; Bellis et al., 2016; Danese & Tan, 2014; Felitti et al., 1998; Maras et al., 2016; Power,

Pereira & Li, 2015; Whitaker et al., 2007; Williamson et al., 2002). Many individuals with SMI have experienced trauma (Booth & Stinson, 2015; Stinson, Quinn & Levenson, 2016); the prevalence of individuals who have experienced adverse life experiences being significantly higher in secure settings (Mills, Davies & Clarke, 2022). Therefore, it likely that psychological distress and maladaptive coping mechanisms are additional influence on eating behaviours within secure settings. This literature review will discuss the likely contribution of each of these areas on body weight, drawing from research conducted in the general population as well as in individuals with SMI.

2.4 Cognitive Factors that Influence Eating Behaviour in Obesogenic Settings

2.4.1 The Attentional Capture of Foods

There is an array of literature that has explored how individual differences in appetitive behaviour translate to weight gain (see Hagan et al. 2020 and Hendriske et al., 2015 for reviews). Lowe et al. (2009) hypothesised that food rich environments amplify motivation to overeat; as individuals who are vulnerable to weight gain are often hyper-responsive to food cues (the sight or smell of food stimuli) (Belfort-DeAguiar & Seo, 2019; Schultes et al., 2010; Ulrich et al., 2013). Although there is limited research documenting the pull of hedonic foods in the secure psychiatric environment, it is plausible that the ubiquitous exposure to food cues within this setting could impact on patient's eating behaviour. Over the last decade there has been an emerging body of literature outlining the role that attentional processes have on the propensity to gain weight (Hagan et al., 2020; Hendrikse et al., 2015). Attentional bias refers to a cognitive process that directs attention towards salient stimuli compared to neutral stimuli (Cisler & Koster, 2010; Hagan et al., 2020). It is thought that this creates an increased motivation to consume the substance (i.e., palatable food), which will be

shown behaviourally by increased orientation towards cues that are associated with the substance (Folkvord, Anschutz & Buijzen, 2020).

The Incentive-Sensitisation Model (Robinson & Berridge, 1993) provides an explanation for why attentional bias to food cues may develop in individuals who habitually overeat. Repeated exposure to the rewarding properties of substances (i.e., food) leads to the alteration of the meso-cortico-limbic dopamine system (particularly the nuclear accumbens and ventral striatum; areas of the brain that mediate reward) (Broadley et al., 2019; Doolan et al., 2015; Field et al., 2016; Loeber et al., 2012; Menon & Uddin, 2010; Pelchat et al., 2004; Stice et al., 2008; Stice et al., 2010; Yokum, Ng & Stice, 2011). This associated learning leads to enhanced cognitive resources being allocated to the processing of relevant cues in the environment. In terms of eating behaviour, this may lead to greater attention being allocated to the processing of food stimuli, this hyper-responsivity is thought to be motivate individuals to overeat (Doolan et al., 2015).

A systematic review by Hendrikse et al. (2015) synthesised the results of experiments which have aimed to document attentional bias to food cues Hendrikse et al. (2015) highlight that 15 out of 19 studies provided evidence that those who were overweight or obese had higher attentional bias to food cues. There are several different paradigms to capture a attentional bias (see Table 2.1 for summary), however, the most common paradigm is the Visual Dot Probe Task (VDP) (Hendriske et al. 2015). Studies that have used the VDP to measure actions to food cues, consistently find that compared to those of normal body weight, overweight and obese participants responded quicker to probes that replaced high-calorie food stimuli compared to neutral stimuli (Castellanos et al., 2009; Garcia-Garcia et al., 2012; Kemps, Tiggemann & Hollitt, 2014; Loeber et al., 2012; Nijs et al., 2010;

Werthmann et al., 2011). These responses (attentional bias) are quicker than participants whose BMI was within the healthy range. There is some evidence to suggest that differences in attentional bias are maintained even in conditions where participants are satiated (Castellanos et al., 2009; Werthmann et al., 2011).

Table 2.1
Description of common measures of attentional bias.

Measure	Description	Calculating Attentional Bias
Visual Dot Probe (VDP)	Participants are asked to detect the position of a target or probe. This probe can appear in one of two possible locations, replacing either a salient stimulus or neutral stimulus. The time taken, in milliseconds (ms), to correctly detect the probe is inferred as a measure of attentional resources which were allocated to the stimulus that proceed it.	Attentional bias is calculated by subtracting mean reaction times (RT) to probes that replacing food stimuli from the mean RTs to probes replacing neutral stimuli. A positive bias score suggests that greater attention was orientated towards the salient stimuli compared to the neutral stimuli.
Attention Network Test (ANT)	The task explores responses in three attention networks, namely: alerting, orientating and executive control. The ANT involves a cue reaction time task and a flanker task,	Longer responses to stimuli are derivative of attentional bias.
Modified stroop task	Aims to measure food cue reactivity. Participants will be presented with a neutral word or food word (the salient stimulus). These words will be printed in different colours. Participants are required to name the colour of the word as quickly as possible whilst ignoring the content of the word. Difficulty to disengage or respond to these words suggests that attention resources are automatically being allocated towards these stimuli.	Attentional bias for a food item would be illustrated by the participant taking longer to name the colour of the food word compared to neutral words.
Eye tracking	Eye tracking measures eye movements and gaze position	Attentional bias for a food item would be illustrated by

Eye tracking (continued)	throughout tasks such as the VDP or modified-stroop. This allows the researcher to distinguish between different stages of attentional processing. The first area of interest that the eye visits upon presentation of stimuli relates to an initial, orientation attentional bias. The amount of time that the eye maintains attention towards stimuli (the dwell time), is related to the maintenance of attention towards stimuli	the participant taking longer to name the colour of the food word compared to neutral words.

However not all studies have documented a robust relationship between attentional bias and body weight (Doolan et al., 2014; Fang et al., 2019; Hagan et al. 2020; McGeown & Davis, 2018; Nijs et al., 2010a; Nijs et al., 2010b; Phelan et al., 2011; Werthmann et al., 2011; Werthmann et al., 2015). A recent meta-analysis by Hagan et al. (2020) suggests that there is limited evidence that attentional bias directly influences body weight and that other factors such as inhibitory control may explain the relationship between attentional bias scores and BMI. This meta-analysis controlled for co-variates that are likely to influence responsiveness to food cues (e.g., how satiated participants were, energy density of foods used as stimuli on the task). The findings highlight that variation in body weight cannot be attributed solely to individual differences in attentional processes and suggests that other cognitive processes are also important in understanding why an individual habitually overeats.

Cognitive processes related to top-down cognitive control (i.e., disinhibition or impulsivity) are likely to influence how much an individual's eating behaviour reflects their tendency to respond to food cues. Disinhibited eating, is a form of dysregulated eating behaviour that is characterised by a loss of control when eating and has a high prevalence in

individuals with SMI compared to the general population (Cuntz et al., 2001; Marcus et al., 1990; Riener, Schindler & Ludvik, 2006; Yanovski et al., 1993). These prevalence rates likely reflect deficits in inhibitory control that are associated with symptoms of SMI (Cuntz et al., 2001; Marcus et al., 1990; Riener, Schindler & Ludvik, 2006; Yanovski et al., 1993).

Neuroimaging studies show that exposure to food cues in chronic dieters (individuals within the general population who have poor inhibitory control) is associated with increased activation of the brain's reward system (Lopez et al. 2017). This provides further support that difficulties in regulating eating behaviours are likely to arise when individuals who have deficits in executive control are exposed to food cues. Seage and Lee (2017) explored whether disinhibited was associated with attentional bias; in a sample of 45 undergraduate students (mean BMI = 23.6kg/m2) indices of attentional bias were found to be higher in individuals who reported frequent disinhibited eating. However, in this sample individuals who had high scores on measures of disinhibited eaters were not found to have significantly higher body weights than those with low scores. This contradicts the wider literature, where disinhibited eating is typically associated with weight gain and obesity (Afari et al., 2019; Bressile et al., 2004; Hays & Roberts, 2008; Hays et al., 2002; Lindroos et al., 1997; Provencher et al., 2012; Wilkinson et al., 2010) and difficulty maintaining weight loss (Afari et al., 2019; Bryant, King, & Blundell, 2007; Niemeier et al., 2007).

2.4.2 Summary

- Individual variability in responsiveness to food cues may be a predictor of weight gain in SMI (Hendriske et al., 2015).

- When environments are abundant in food cues, people who are hyperresponsive to food cues and who also have difficulties with regulating their behaviour may be vulnerable to overeating.
- Serious Mental Illness is, in part, characterised by deficits in inhibitory control. When an individual experiences difficulty regulating their eating, they are likely to consume large amounts of high calorie foods and find it difficult to maintain dietary restrictions (Afari et al., 2019; Wilkinson, Rowe, Bishop & Brunstrom, 2010; Lindroos et al., 1997; Westenhoefer, Broeckmann, Münch & Pudel, 1994).

2.5 Clinical Characteristics of SMI and Weight Gain

Sections 2.1, 2.2 and 2.4 highlight that there is likely to be an interplay between the obesogenic nature of secure psychiatric inpatient environment and individual's cognitive responses to food cues. The risk of overeating in such environments may be heightened in populations with SMI as these conditions are associated with deficits in regulating behaviour. However, there are other clinical characteristics of people with SMI that also create obesity risk. This section will outline how these factors contribute to weight gain and obesity.

2.5.1 Clinical Diagnosis

As suggested in Chapter 1 (section 1.1), SMI is characterised by a mental illness that seriously impairs an individual's ability to engage in one or more major life activity (Wang, Demler & Kessler, 2002). Examples of specific SMIs that are highly prevalent amongst secure psychiatric inpatients are substance misuse disorders (Kraanen et al., 2011; Mueser et al., 2000), personality disorders and psychotic disorders such as schizophrenia (Every-Palmer et al., 2018; Hilton et al., 2015; Ogloff, Lemphers & Dwyer, 2004; Tirupati & Chua,

2007; Völlm et al., 2018). These disorders have also been associated with obesity and this is discussed in greater detail below.

2.5.1.1 Substance Misuse

Patients with SMI and who are treated in psychiatric inpatient services often have co-morbid substance misuse problems (Kraanen et al., 2011; Mueser et al., 2000). Substance misuse is referred to as harmful use and/or dependence of psychoactive drugs (McLellan, 2017). Kraanen et al. (2011) found that 36% of inpatients had any substance misuse disorder. This is compared to 17% in the general population (Bonsack et al., 2006). In their study, Kraanen et al. (2011) found that the most frequently misused substance in their sample of secure inpatients was alcohol (27%), followed by cannabis (20%) and cocaine (5%).

When an individual is a regular user of illicit substances this can make them vulnerable to weight gain, however this risk is dependent on the type of substances being used and frequency of consumption (Chouinard et al., 2016; Donnadieu-Rigole et al., 2016). For example, regular consumption of cannabis, cocaine and amphetamines appear to be predictive of higher BMI compared to the general population (Donnadieu-Rigole et al., 2016). These findings are replicated in populations with SMI (Chouinard et al., 2016). Chouinard et al. (2016) found that people with SMI who had a BMI greater than 25kg/m^2 were likely to have dual diagnosis of substance use disorder.

One reason why substance use may be associated with weight gain is that it can promote dysfunctional eating behaviours (Canan et al., 2017; Ross & Ivis, 1999). For example, in an early paper by Ross and Ivis (1999), they suggest that use of illicit substances was positively

associated with binge-eating. They also found that more problematic and heavier substance use was associated with severity of binge-eating (Ross & Ivis, 1999). Another explanation given for the associations between substance misuse and obesity is "reward deficiency syndrome" (Benton & Young, 2016, p. 12). The core idea behind this syndrome is that to compensate for the intensity of the neurological reward stimulation that occurs following consumption of substances (i.e., illicit substances), the density of dopamine D_2 receptors with the brain start to reduce (Benton & Young, 2016; Blum, Thanos & Gold, 2014; Davids et al., 2010). To gain the same level of pleasure, individuals are likely to need to engage in frequent reward seeking behaviour (Carter et al., 2016). This has implications for people who habitually overeat because consumption of palatable foods elicits similar reward pathways in the brain as consumption of illicit substances (Davids et al., 2010; De Macedo, De Freitas & Torres, 2016).

However, it is important to note that some forms of illicit substance use are associated with a reduction in body weight**.** For example, heroin users are more likely to be underweight compared to other substances (McIlwraith et al., 2014). This is because the use of heroin suppresses appetite centres in the brain (Kraft & Vetter, 1991; Wang et al., 2013). Other studies show that, in the presence of addiction to heroin, that users will sacrifice the purchase of food to be able to buy more of the drug (Roddy & Greenwald, 2015). A qualitative study by Neale et al. (2012) attempted to elucidate why this may be the case. They found that heroin users ate infrequently and showed little interest in food. Furthermore, participants noted that following cessation of heroin, that their appetite improved, and their weight increased.

When people with substance misuse disorders are admitted to inpatient services, they typically rapidly gain excess weight (Hodgkins et al., 2004). As some of these patients will have a BMI that is within or below the normal range prior to admission (e.g., heroin users) this may reflect improved nutrition and access to food. However, even patients (with substance use) who are not underweight at baseline also appear to gain weight on admission to inpatient settings. Hodgkins et al. (2004) found that in an adolescence substance misuse service, individuals whose weight was within the normal BMI range gained on average 5kg and increase their BMI by 1.58kg/m^2 during the first 60 days of treatment (Hodgkins et al., 2004).

2.5.1.2 Schizophrenia

The most common SMI experienced by secure inpatients is schizophrenia, with studies suggesting between 60% - 93% of secure inpatients having this diagnosis (Ogloff, Lemphers & Dwyer, 2004; Tirupati & Chua, 2007; Völlm et al., 2018). Schizophrenia is a mental illness characterised by cognitive, behavioural, and emotional symptoms (APA, 2013) that are generally separated into two categories: positive and negative symptoms. Positive symptoms include delusions, hallucinations and disorganised speech or behaviour. Negative symptoms include blunted affect, apathy, and anhedonia (APA, 2013). The risk of overweight and obesity is higher in patients with schizophrenia than the general population (Keck & McElroy, 2003; Marder et al., 2004; Wildes, Marcus & Fagiolini 2006). In some studies, as many as 42% of patients with schizophrenia are reported to be obese, compared to 27% of the general population (Marder et al., 2004).

It is worth noting that schizophrenia is the main condition within a spectrum of psychotic disorders that also includes affective psychosis (psychotic symptoms that occur in the context

of a major depression) and non-affective psychosis (psychotic symptoms not related to emotions or mood and are less severe and pervasive as schizophrenia). In comparison with people who have either affective or non-affective psychosis, people with schizophrenia have been found have higher rates of obesity, abdominal obesity, and higher fat percentage (Saarni et al., 2009). It therefore may be that the severity of psychotic symptoms is an additional factor in the risk for obesity since all psychotic disorders tend to be treated with antipsychotic medications. Indeed, patients with greater severity of symptoms may be prescribed more than one antipsychotic medication (Farrell & Brink, 2020). Farrell and Brink (2020) highlight in their study involving 142 secure inpatients that 55% were prescribed more than one antipsychotic drug. Antipsychotic polypharmacy is implicated in greater adverse effects when compared to monotherapy users, such as greater levels of weight gain (Hashimoto et al., 2012) and greater deficits in neurocognitive function (Elie et al., 2009; Kawai et al., 2006). The association between antipsychotic medication and weight gain in explored in greater detail in section 2.5.2.

Studies report nearly 80% of deaths for people with SMI such as schizophrenia are the result of obesity-related physical health conditions such as ischaemic heart disease, type II diabetes and cerebrovascular disease (Lawrence, Hancock & Kisley, 2013). Many individuals with schizophrenia have unhealthy lifestyles and this predisposes them to poor physical health and comorbid diseases (Connolly & Kelly, 2018; Day & Johnson, 2017; Jahrami et al., 2017; Pack 2009). For example, Jahrami et al. (2017) highlight in their sample of 120 community individuals with schizophrenia, that there was a high prevalence of smoking, alcohol, lower physical activity rates and higher calorie intake than what has been documented in the general population.

In their review, Pack (2009) highlights that many people with schizophrenia have a diet that is high in saturated fat, low in fibre and consume large quantities of fast food and sugary drinks (Pack, 2009). They consume fewer portions of fruit and vegetables, drink less skimmed or less semi-skimmed milk, and eat less healthy option foods such as potatoes, pasta, rice and pulses compared to healthy males. Furthermore, up to 36% of men and 34% of women with schizophrenia do not engage in exercise. Females with schizophrenia also eat less healthy food compared to those that do not have the disease (Pack, 2009). Whilst these studies do not relate specifically to secure psychiatric inpatients, they are concerning given that many secure inpatients have a diagnosis of schizophrenia and that restrictions placed upon inpatients may mean that they have less opportunity to engage in physical activity. If patients are not engaging in physical activity and consuming unhealthy foods in excesses e, then it is highly likely that patients will see significant increases in their bodyweight.

2.5.1.3 *Personality Disorders*

Many secure inpatients have a diagnosis of personality disorder (PD) either as their primary diagnosis or as a diagnosis secondary (but not limited) to schizophrenia or bipolar. A PD is defined by WHO (ICD-10; 2004, pp.157) as **"**a severe disturbance in the characterological constitution and behavioural tendencies of the individual, usually involving several areas of the personality, and nearly always associated with considerable personal and social disruption". Personality disorders are considered a life-long developmental condition with onset appearing in late childhood or adolescence (WHO, 2004). There are several different types of PD, and these are categorised into three clusters: including A, B and C. These clusters relate to how the person presents themselves, for example, eccentric, dramatic and anxious, respectively (WHO, 2004). Table 2.2 highlights the different types of PDs and their associated cluster.

Table 2.2.
Specific personality disorders

Cluster	Specific Personality Disorder
Eccentric (A)	Paranoid Schizoid Schizotypal
Dramatic (B)	Antisocial Borderline (emotionally unstable) Histrionic Narcissistic
Anxious (C)	Avoidant Dependent Obsessive-compulsive

Note. World Health Organisation (1990).

The odds of having any PD are greater in individuals who are obese and/or severely obese relative to people with a normal weight (Gerlach, Loeber & Herpertz, 2016; Mather et al., 2008; Petry et al., 2008). For example, studies have demonstrated that 18% of obese participants and 23% of extremely obese participants have a PD. This is compared to 14% of participants who were normal weight. Other studies have found in people who are in the obesity class III range that 23.4% have a PD (Gerlach, Loeber & Herpertz, 2016). This is compared to 1.8% of the British population that are within the obesity class III range (Keaver et al., 2020). An earlier study comparing prevalence for personality disorder amongst morbidly obese participants and normal weight participants conducted by Black, Goldstein and Mason (1992) found that 72% of the morbidly obese group met criteria for any personality disorder, compared to 37% of the comparator group. However, the diagnostic criteria used in this study was an earlier addition of the DSM, DSM-III (APA, 1980). It is likely that the increased understanding of personality disorders and the subsequent diagnostic changes that have occurred may account for the large discrepancy between Gerlach, Loeber and Herpertz (2016) and Black, Goldstein and Mason's (1992) results.

The above information that highlights associations between a diagnosis of PD and obesity has important applications for treatment of secure psychiatric inpatients, given that there are high prevalence rates for PD within this population. For example, the National Public Health Service for Wales (2005) suggested that two thirds of patients in medium and high secure services have a diagnosis of PD. What the above literature does not reveal, however, is the causal direction of the association between PD and obesity. It is not clear from these studies whether personality disorders predispose people to obesity or whether early onset of obesity predisposes the development of maladaptive personality traits.

2.5.2 Common Medications Prescribed in Populations with SMI and Their Impact on Body Weight

2.5.2.1 Antipsychotic Medication

NICE (2014a) recommends that many SMIs should be treated by oral antipsychotic medication in conjunction with psychological interventions. There are a variety of antipsychotic medications that are commonly prescribed to patients with SMI. These are categorised as first-generation (typical) antipsychotics and newer second generation (atypical) antipsychotics. The key differences in these two types of medication are their neuro-chemical effects (Dazzan et al., 2005). Typical antipsychotics work by blocking the dopamine (D_2) receptors. This in turn improves positive symptoms that are associated with schizophrenia. However, because of blocked D_2 transmission, there are several side effects. Extrapyramidal Side-Effects (EPS) are strongly associated with the use of these types of antipsychotics. These EPS include dyskinesia, dystonia, Parkinsonism, akinesia, and neuroleptic malignant syndrome (Miller, 2008). Atypical antipsychotics do work in part by blocking D_2 secretion, however they also have an affinity to antagonise serotonergic secretion

by blocking 5-HT_{2C} receptors (Dazzan et al., 2005). The dual action of atypical antipsychotics means that there is a reduction in EPSs and improvements in both positive and negative symptoms. It is this reason why they are the drug of choice for treating serious mental illness in modern psychiatry.

Whilst they are an effective medication, atypical antipsychotics still have problematic side-effects. One of the most common side effects for atypical antipsychotic medication is weight gain (see Gentile, 2006 and Leucht et al., 2013 for reviews). Some atypical antipsychotics are associated with greater amounts of weight gain compared to others (Allison et al., 1999; Leucht et al., 2013). Based on these findings, the Maudsley Prescribing Guidelines in Psychiatry (13th ed; Taylor, Barnes & Young, 2018) have categorised antipsychotic medication in terms of the risk associated with their use. The Maudsley Prescribing Guidelines in Psychiatry (Taylor, Barnes & Young, 2018) categorise the weight gain risk of antipsychotic medication as low, moderate and high. The weight gain risk of commonly prescribed atypical antipsychotic medication is highlighted in Table 2.3, below.

Table 2.3.
Atypical antipsychotic drugs and their weight gain risk

Drug	Level of weight gain risk
Clozapine	High
Olanzapine	
Iloperidone	Moderate
Sertindole	
Quetiapine	
Risperidone	
Paliperidone	
Amisulpride	Low
Asenapine	
Brexipiprazole	
Aripiprazole	
Cariprazine	
Lurasidone	
Sulpride	
Ziprasidone	

Note. Based on Taylor, Barnes and Young (2018).

Clozapine and olanzapine are perhaps the most effective atypical antipsychotic drugs for treatment resistant schizophrenia (Leucht et al., 2013). Both drugs have a high affinity to block 5-HTC_{2C} receptors (Leucht et al., 2013). Clozapine is related to several serious physical health side effects. For this reason, it is only used as a last resort for patients who are not responding to other antipsychotic medications and requires regular blood monitoring. In some people it can cause life threatening changes to white blood cells (Faye et al., 2018). Use of clozapine can cause an increase in weight of 3.7kg in six weeks of use (Meltzer, Perry

& Jayathilake, 2003). This figure increases to 7.3-7.6kg when used for six months (Lamberti, Bellinier & Schwarzkopf, 1992; Meltzer, Perry & Jayathilake, 2003). In some studies, over 35% of users gain more than 10% of their pre-clozapine-use body weight (Hummer et al., 1995). When compared to typical antipsychotics, clozapine users gain up to 7kg more weight than typical antipsychotic users (Covell, Weissman & Essock, 2004; Hummer et al., 1995). Outpatient services also report clozapine-associated weight gain (Lau et al., 2016). Between three to 12 months of clozapine treatment causes outpatients mean body weight to increase by 3.1% (Lau et al., 2016).

Weight gain with clozapine is both significant and common (Lamberti, Bellinier & Schwarzkopf, 1992; Leadbetter et al., 1992). Seventy-five percent of psychiatric inpatients gain at least 10lbs of weight within six months (Lamberti, Bellinier & Schwarzkopf, 1992). In their study, Leadbetter et al. (1992) found that 67% of patients gained significant weight during 16 weeks of clozapine treatment. Weight gain associated with clozapine is primarily seen within the first three to 12 months of use (Hummer et al., 1995; Umbricht, Pollack & Kane, 1994). Whilst significant weight gain will tend to taper off after this time, weight gain will continue for up to three years, as documented in some studies (Umbricht, Pollack & Kane, 1994). Doctors prescribing clozapine must carefully consider the likely cost-benefit balance between life diminishing effects such as the need for regular blood monitoring, weight gain and risk for metabolic syndrome versus life enhancing therapeutic effects such as the degree of relief from psychotic symptoms that might be achieved.

It seems that the people that are most at risk of gaining weight on clozapine are those that have a low BMI before commencing use of the drug (Bai et al., 2006; Hummer et al., 1995; Lau et al., 2016; Umbricht, Pollack & Kane, 1994). This is the case in both inpatient and outpatient services. In relation to patients with a normal BMI, they can gain up to 4kg over 16

weeks of clozapine treatment, compared to overweight (2.6kg) and obese patients (0.36kg; de Leon et al., 2007). It appears that dosage is also a risk factor for weight gain in clozapine users with the higher the dose the more weight being gained (de Leon et al., 2007).

Olanzapine, as shown in Table 2.3, is also an antipsychotic drug that is associated with a high risk of weight gain. The literature regarding olanzapine is conflicting, in that some studies suggest that levels of weight gain are like that of clozapine and others suggesting that the drug is associated with twice as much weight gain as clozapine in child, adolescent and adult psychiatric populations (Fleischhacker et al., 2009; Krakowski, Czobor & Citrome, 2009). In terms of prevalence of weight gain, 74.5% of olanzapine users experience this as a side effect (Bobes et al., 2003). This was compared to risperidone (53.4%) and haloperidol (40%; Bobes et al., 2003). Olanzapine use has also been associated with increased risk of diabetes onset (Ramaswamy, Masand & Nasrallah, 2006). A review by Citrome et al. (2011) highlighted mean weight gain during treatment with olanzapine ranging from 2kg to 4kg for short term use (three to six weeks) and this was significantly more than placebo (-0.4kg). In the same review the authors show that olanzapine related weight gain is dose dependent. This is to say that the higher the dose, the more weight the user appears to gain (Citrome et al., 2011). Furthermore, 1kg of weight gain after two weeks of olanzapine use is a reliable predictor of weight gain at six weeks of treatment (Lin et al., 2018). The risk of weight gain induced by olanzapine is increased five-fold for every 10g chlorpromazine equivalent dose increase (Spertus et al., 2018). Much like clozapine, olanzapine related weight gain is greater in those with a lower BMI at baseline (Gentile, 2006). Furthermore, a BMI $\geq$27.6 leads to lower weight gain than patients with a low-to-medium BMI (Gentile, 2006).

It is clear from the literature that clozapine and olanzapine lead to the most weight gain (Bobes et al., 2003; Covell, Weissman & Essock, 2004; Fleischhacker et al., 2009; Hummer et al., 1995; Krakowski, Czobor & Citrome, 2009; Leucht et al., 2007; Leucht et al., 2013; Leucht et al., 2017). This is not to say that other atypical antipsychotics do not induce weight gain, however. Risperidone is commonly used and is associated with moderate increases in weight (Schoretsanitis et al., 2018; Taylor, Barnes & Young, 2018). Prevalence rates of weight gain in users appear to be between 37% and 63% (Farwell et al., 2004; Saddichha, Ameen & Akhtar, 2008). Much like clozapine and olanzapine, there is an association between low baseline BMI and greater increases in weight during treatment periods (Saddichha, Ameen & Akhtar, 2008). There are some studies that suggest there is little to no weight gain for elderly patients using risperidone, however (Barak, 2002). Conversely, patients have been reported to gain up to 8.64kg in 6 months of treatment with the drug (Kelly et al., 2009). Individuals with intellectual disability also gain up to 8kg of weight with risperidone treatment (Cohen et al., 2001). This weight gain is seen over a longer treatment period. Unlike with clozapine and olanzapine, weight gain associated with risperidone is not dose dependent (Cohen et al., 2001). Other atypical antipsychotics associated with moderate increases in weight include iloperidone, quetiapine and paliperidone (Atmaca et al., 2003; Cutler et al., 2013; McEvoy et al., 2014; Taylor, Barnes & Young, 2018).

Iloperidone has been shown to induce up to 3.5kg of weight in over 29 weeks of use (Cutler et al., 2013). Evidence does suggest that weight gain associated with iloperidone stabilises over time (Cutler et al., 2013). Mean increases in weight associated with quetiapine are reported to be 3.9kg over six weeks of treatment (Atmaca et al., 2003). Less weight gain is seen in users of paliperidone (McEvoy et al., 2014). Mean weight gain over six months of

treatment is over 2kg (McEvoy et al., 2014; Taylor, Barnes & Young, 2018). Lower levels of weight gain have been associated with drugs such as aripiprazole and amisulpride (Leucht et al., 2004; Taylor, Barnes & Young, 2018). Aripiprazole has even been associated with loses in weight (Englisch et al., 2009). Conversely, there is literature to suggest patients suffering from anorexia nervosa gain weight when taking aripiprazole (Frank et al., 2017). Weight gain in antipsychotic drug users is most prevalent in those with low BMI which may explain this finding. Moreover, eight weeks of amisulpride causes >4kg in weight in some populations (Deepak et al., 2015).

2.5.2.2 Antidepressant Medication

Several commonly prescribed antidepressants are associated with weight gain (Kyle & Kuehl, 2013; Saunders et al., 2016; Zimmerman et al., 2003). A summary of these can be found in Table 2.4. There are numerous different types of antidepressants, with two of the most common being Selective Serotonin Reuptake Inhibitors (SSRIs) and Tricyclic Antidepressants (TCAs). Whilst these drugs have a common feature, to alleviate symptoms of depression and anxiety, there are some differences in the way that they act in the brain (Moraczewski & Aedma, 2020). For example, TCAs work primarily by inhibiting the reuptake of the neurotransmitter's serotonin and norepinephrine (Moraczewski & Aedma, 2020). On the other hand, SSRIs work only on the inhibition of serotonin reuptake (Artigas, Nutt & Shelton, 2002). In terms of the weight gain, the result is that TCAs have a greater risk of inducing weight gain compared to SSRIs (Kyle & Kuehl, 2013; Saunders et al., 2016). For example, TCAs such as amitriptyline, doxepin, imipramine, nortriptyline, trimipramine and mirtazapine are all associated with significant weight gain during use (Kyle & Kuehl, 2013; Saunders et al., 2016). Specifically, amitriptyline and mirtazapine have been associated with 1.8kg and 1.5kg of weight gain respectively (Saunders et al., 2016). Conversely, most SSRIs

are either associated with weight neutrality or weight loss (see Table 2.4), however one SSRI; paroxetine, has been associated with a 3.6% body weight increase after 26-32 weeks of treatment (Zimmermann et al., 2003).

Table 2.4.
Antidepressant medication associated with high and low weight gain risk

Type of Antidepressant	Antidepressant Drug Name
High risk	
Tricyclic antidepressant	Amitryptaline Doxepin Imipramine Nortriptyline Trimipramine Mirtazapine
Selective Serotonin Reuptake Inhibitor	Paroxetine
Other	Lithium carbonate
Low risk	
Selective Serotonin Reuptake Inhibitor	Sertraline Fluoxetine
Other	Bupropion

Note. Based on Kyle and Kuehl (2013); Saunders et al. (2016).

It has been acknowledged since the 1960s that TCAs influence appetite and can promote weight gain (Brown & Brown, 1967; Garland, Remick & Zis, 1988; Montgomery et al., 1981; Nakra et al., 1977; Paykel, Mueller & De La Vergne, 1973; Stolar, 1988, pp.89). One study from the 1980s postulates that the increase of noradrenergic activity as a result of TCA use may inhibit satiety and promote craving of carbohydrates (Garland, Remick & Zis, 1988). These mechanisms of action are different from those in SSRIs. This however does not explain why some SSRIs promote weight gain and others do not. One possible explanation is that paroxetine has a much less favourable tolerability profile compared to many other SSRIs

is a more potent inhibitor of serotonin reuptake compared to the other SSRIs (Purgato et al., 2014). Whilst this is the case, data shows that potency in this respect does not affect the efficacy of antidepressant medication (Sanchez, Reines & Montgomery, 2014). Therefore, it may be plausible to propose that weight gain seen in users of paroxetine could be the result of the severity of depressive symptoms, as paroxetine is used for people with more serious cases of anxiety and depression (Purgato et al., 2014).

2.5.2.3 Other Commonly Prescribed Medications in Individuals with SMI

As stated previously, people with SMI have a high incidence for co-morbid physical illnesses (see Chapter 1, section 1.1). Several medications are employed to treat these illnesses, such as antidiabetics, hypertensives and steroid hormones with some of these being multifunctional, such that they are used to treat more than one ailment (Sajatovic et al., 2007). For example, anticonvulsant medications and antihistamines are frequently used with psychiatric patients to stabilise mood and treat psychosis, respectively (Sajatovic et al., 2007). Within the published literature in this area there are several papers that have identify drugs propensity for weight gain; these often classify the medication of those which are high risk for weight gain, weight neutral or those associated with weight loss (Kyle & Kuehl, 2013; Saunders et al., 2016). For the purpose of this section, medications have been grouped as either high or low in terms of their association with weight gain in line with the pharmacological and weight gain literature. This is shown in Table 2.5, below.

Table 2.5.
Physical health medication associated with high and low weight gain risk

Function	Generic Drug Name
High risk	
Anti-diabetic	*Thiazolidinesdiones:* -pioglitazone *Sulfonylureas:* -glimepiride -glyburide -glipizide *Insulin:* -lispro -aspart -glulisine *Dipeptifylpeptidase-4 inhibitors:* -sitagliptin
Hypertensive	*Beta-adrenergic blockers:* -atenolol -metoprolol -nadolol -propranolol
Anticonvulsant	Sodium valproate Gabapentin
Steroid hormones	*Oral corticosteroids:* -prednisolone -cortisone *Inhaled corticosteroids:* -budesonide -ciclesonide -fluticasone *Hormone therapy* -estrogen -progestogens
Antihistamine	Diphenhydramine

Low risk	
Antidiabetic	*Glucagon-like peptide-1 inhibitors:* -exenatide -liraglutide *Sodium-glucose co-transporter inhibitor:* -metformin *Alpha-glucosidase inhibitors:* -miglitol -acarbose) *Amylin analogue:* -pramlinitide
Hypertensive	Angiotensin-converting enzyme Angiotensin receptor blockers Calcium channel blockers
Anticonvulsant	Carbamazepine

Note. Based on Grootens et al (2017); Kyle and Kuehl (2013); Saunders et al., (2016).

As can be seen from Table 2.5, generally antidiabetic medications have a high risk of inducing weight gain in users, which is both paradoxical and counterproductive. The literature tends to suggest that antidiabetic drugs such as pioglitazone, have been associated with 1.77 to 2.08kg of weight gain during use. Moreover glimepiride, glyburide, glipizide and insulin secretagogues are associated with averages of between 1.5-2.5kg of weight gain (Kyle & Kuehl, 2013; Saunders et al., 2016). It is noteworthy that these drugs are associated with weight gain, since onset of diabetes is commonly associated with obesity. One explanation offered is that improvements in glucose control associated with their use can often lead to weight gain (Hollander, 2007). This essentially means that the body is better able to store and use glucose. However, excess glucose is either stored in the liver or converted to fatty acids and stored as fat in adipose tissue (Glimcher & Lee, 2009).

Therefore, if an individual consumes a diet that is high in glucose, this will lead to weight gain. Whilst it may seem contradictory that use of diabetic drugs leads to weight gain, the most common drugs to treat type II diabetes (the type of diabetes most associated with obesity), such as metformin, are associated with a low risk of weight gain. In any case, prescribers are recommended to consider the weight of patients before prescribing them specific diabetic pharmacological treatment (Goswani, Shinkazh & Davis, 2014).

What also may seem contradictory is that there are hypertensive medications that are associated with weight gain, despite hypertension itself being associated with obesity (Hall et al., 2019; Rocchini, 2002). Specifically, beta-adrenergic blockers such as atenolol, metoprolol, nadolol and propranolol have been shown to promote up to 1.2kg of weight gain. It is not fully understood why beta-blockers are associated with weight gain, although one postulation is that use of beta-blockers can slow metabolism (Marketou et al., 2017) which often results in weight gain because the body burns fewer calories. Anticonvulsant drugs also have strong associations with weight gain. Valproic acid or sodium valproate has been associated with up to 15 to 20kg increases in weight (Grootens et al., 2017; Kyle & Kuehl, 2013). Literature does exist that attempts to explain why there is a significant association between anticonvulsant medication and weight gain. In their paper, de Gaspari and Guerreiro (2010) postulate that drugs like sodium valproate can induce insulin resistance and hyperinsulinemia. This is an issue with regards to weight gain because people with hyperinsulinemia remain sensitive to the lipogenic effects despite experiencing resistance to insulin's effect on glucose transportation (Erion & Corkey, 2017; Ye, 2013). There is work that has been conducted to explore if hyperinsulinemia influences appetite, however this work showed no significant associations (Gielkens et al., 1998). This is contrary to what is believed about the use of antihistamines, however. As shown by Kyle and Kuehl (2013),

diphenhydramine is associated with weight gain. Literature proposes that activation of histamine neurotransmitters in the brain decrease hunger (Jørgensen et al., 2007). It has therefore been proposed that antihistamine drugs have the opposite effect, and negatively impact feelings of satiety in users (Ratliff et al., 2010).

2.5.3 Summary

Diagnosis

- Individuals with SMI, such as schizophrenia and PD, have a higher prevalence for obesity (Chouinard et al., 2016; Donnadieu-Rigole et al., 2016; Gerlach, Loeber & Herpertz, 2016; Keck & McElroy, 2003; Marder et al., 2004; Mather et al., 2008; Petry et al., 2008; Wildes, Marcus & Fagiolini 2006).
- Those with a substance misuse disorder will rapidly gain weight upon admission to inpatient services (Hodgkins et al., 2004).
- Excessive weight gain in this population may be explained by a reward deficiency syndrome (Benton & Young, 2016).
- It is not fully understood why these clinical diagnoses are associated with excess body weight; however, it could be explained by psychotropic medication used to manage symptoms of these disorders.

Psychotropic medication

- Certain psychotropic medication used to treat symptoms of SMI are highly associated with excessive weight gain upon their use.

- These include antipsychotics (Gentile et al., 2006; Leucht et al., 2013) and antidepressants (Kyle & Kuehl, 2013; Saunders et al., 2016).
- Those who are at risk of the most amount of weight gain with some psychotropic medication are those with a lower body weight upon their use (Bai et al., 2006; Hummer et al., 1995; Lau et al., 2016; Umbricht, Pollack & Kane, 1994).
- Weight gain with psychotropic medication is also dose dependent (de Leon et al., 2007).

Other commonly prescribed medication

- Due to the high incidences of co-morbid physical illnesses amongst those with SMI, these individuals are prescribed a range of medication to manage physical health symptoms.
- Much like with psychotropic medication, these medications have been implicated in weight gain (Grootens et al., 2017; Kyle & Kuehl, 2013; Saunders et al., 2016).

2.6 Psychological Influences on Weight Gain in Individuals with SMI

There is an evidence base that suggests there are strong associations between SMI, deficits in the ability to form and maintain healthy interpersonal relationships (a concept otherwise known as insecure attachment), and early traumatic experiences (Booth & Stinson, 2015; Carr & McNulty, 2016; Dolan & Whitworth, 2013; Dvir, Denietolis & Frazier, 2013; Heins et al., 2011; Hughes et al., 2019; Kelleher et al., 2008; Kelleher et al., 2013; Larkin & Read, 2008; Lu et al., 2008; Misiak et al., 2017; Muskett, 2014**;** Porter et al., 2020**;** Rajkumar, 2014; Schäfer & Fisher, 2011). This is likely because trauma during the early stages of brain growth can alter the development of that brain (Geuze et al., 2005; Teicher & Samson, 2016).

The following sections outlines the prevalence of early trauma and insecure attachment in secure psychiatric inpatients. These sections also explore the association between early trauma, attachment problems, and weight gain in these individuals.

2.6.1 Trauma and SMI

As suggested above, there is a strong argument that one of the primary causes for the onset of SMI is experience of, or exposure to, early trauma such as abuse (physical and sexual), neglect and dysfunctional family dynamics (Booth & Stinson, 2015; Dolan & Whitworth, 2013; Dvir, Denietolis & Frazier, 2013; Heins et al., 2011; Hughes et al., 2019; Kelleher et al., 2008; Kelleher et al., 2013; Larkin & Read, 2008; Lu et al., 2008; Misiak et al., 2017; Muskett, 2014; Porter et al., 2020; Rajkumar, 2014; Schäfer & Fisher, 2011). Trauma is also a common feature among forensic inpatients (Booth & Stinson, 2015; Dolan & Whitworth, 2013; Glasser at al., 2001; Stinson, Quinn & Levenson, 2016).

Glasser et al. (2001) highlight in their British sample of forensic inpatients (n = 747 male, n = 96 female) that 46% of male patients and 43% of female patients had experienced childhood sexual abuse. Smaller figures were reported in a cohort of 221 secure psychiatric inpatient in the American mid-west (Booth & Stinston, 2015). In this sample, over a quarter of participants had been victim of physical abuse and or sexual abuse. This patient group also had experienced high rates emotional and verbal abuse (18.9%), intimate partner violence (16%), neglect (14.2%), parental divorce or separation (25.9%), caregiver mental illness (21.2%) and caregiver substance abuse (24.5%).

Adverse Childhood Experiences (ACEs) is the term used to encompass experiences of abuse, neglect and exposure to domestic abuse, family members who misuse substances, who have poor mental health or have been incarcerated (Bellis et al., 2016). A study into ACEs in the general population of Wales found that 47% of adults have experienced at least one ACE during their childhood, with verbal abuse being the most common (Bellis et al., 2016). Fourteen percent of adults experienced four or more ACEs. Patients in secure settings report much high incidence of childhood trauma. For example, some studies highlight that up to 63% of secure inpatients report having experienced at least one ACE and 25% have experienced four or more (Booth & Stinson, 2015). The notion of greater prevalence of ACEs in secure psychiatric services is supported by Stinson, Quinn and Levenson (2016). In a sample of 381 male and female secure psychiatric inpatients, 75.1% experienced at least one type of childhood maltreatment. Furthermore, 19.9% of this sample had experienced four or more ACEs. Whilst this figure is slightly smaller than Booth and Stinson's (2015) findings, it still highlights the significant difference in the prevalence of ACEs in secure psychiatric inpatients compared to the general population.

Trauma in childhood can have significant impacts on the development of children's brains (Muskett, 2014; Navalta, McGee & Underwood, 2018; Sheridan & McLaughlin, 2014; Teicher & Samson, 2016), and may predispose them to mental ill health in the future (Geuze et al., 2005; Teicher & Samson, 2016). A markedly increased activation within the amygdala in response to early exposure to threat has negative implications for the future of that brain. When neutral stimuli become conditioned as threatening, there is an increased vigilance towards these conditioned threat related cues which results in bias of attention towards threat-related stimuli (Sheridan & McLaughlin, 2014; Tapper, Pothos & Lawrence, 2010; Waechter et al., 2014; Wilson & Wallis, 2013). Unlike the hippocampus, evidence suggests that early

exposure to stress is associated with an increase in volume in of the amygdala (Buss et al., 2012; Kuo, Kaloupek & Woodward, 2012). This is because both psychological stressors and the release of stress hormones stimulates the arborisation of dendrites within amygdala cells (Mitra et al., 2005; Mitra, Ferguson & Spalosky, 2009; Vyas, Jadhav & Chattarji, 2006). Abnormalities in the amygdala have been associated with the prevalence of psychiatric disorders such as mood disorders, psychosis, and personality disorders and these are also seen in people who experience ACEs (Barbour et al., 2020; Jennes et al., 2020; Navalta, McGee & Underwood, 2018; Sturm, Haase & Levenson, 2016; Teicher & Samson, 2016). Furthermore, the number of ACEs that people experience is also likely to contribute to the severity of affective symptoms (Navalta, McGee & Underwood, 2018).

Further neuro-developmental complications that can arise from early exposure to threat include lower structural and functional connectivity between the ventromedial prefrontal cortex and amygdala and hippocampus (Sheridan & McLaughlin, 2014). Evidence suggests that there is up to 6.5% reductions in cortical matter within orphans with experiences of deprivation (Sheridan et al., 2012). This marked decrease in cortical matter is seen even when demographics are controlled for in the sample. These reductions are primarily seen within the prefrontal cortex, an area of the brain that is primarily associated with complex cognitive behaviour, personality expression, decision making, and moderating social behaviour (Adolphs, 2003; Bass & Nussbaum, 2010; Clark, Cools & Robbins, 2004; Forbes et al., 2014; Miller, 2007; Nishinaka et al., 2016). These are common features among individuals who are treated in secure psychiatric services (Brower & Price, 2001; Hornsveld & Nijman, 2005; Morice, 1990).

Extensive international research has shown that the more ACEs a person experiences, the greater the likelihood of them engaging in health harming behaviours in adulthood (e,g. smoking, substance use, violence, risky sexual behaviour and poor diet) and incarceration (Bellis et al., 2016; see also Centres for Disease Control and Prevention, (2020) for an comprehensive list of published papers). The origins of ACE research are deeply rooted in understanding eating behaviours and obesity (Noorzada, 2016). The seminal ACE study was conducted after Felitti (1998) wanted to explain attrition within his obesity clinic; around 50% of patients dropped out of treatment, the attrition was difficult to explain because many had been successfully losing weight. Felitti (1998) suggested that excessive weight gain may often be intentional in individuals who had experienced trauma and was used as means of shielding unwanted sexual attention. This proposition has been supported in a review conducted by Ross (2009) who suggested that people who experience abuse may wish to become larger as a means of protecting themselves against attackers, or, to become less desirable when abuse is sexual. A further explanation is that excessive weight is gained because food becomes a means of experiencing comfort or as mechanism to cope with stress through modulation of neurotransmitters associated with negative affect (Ross, 2009). For example, there is evidence that suggests people who experience negative affect are more likely to engage in behaviours that are associated with activation of reward centres within the brain, and this includes behaviours such as consuming high calorie foods (Alonso-Alonso et al., 2015; De Macedo, De Freitas & De Silva Torres, 2016; see also section 2.4.2).

The literature base that pertains to ACEs and obesity prevalence shows that as the number of ACEs increases, so too does the prevalence for health-harming behaviours that lead to obesity (Bellis et al., 2016; Felitti et al., 1998). This literature base also proposes that social, verbal abuse, physical abuse, fear of physical abuse and neglect are associated with increased

body weight and increased risk of obesity (Danese & Tan, 2014; Power, Pinto & Li, 2015; Whitaker et al., 2007; Williams et al., 2002). Williams et al. (2002) highlights that participants from the general population in the US who experienced abuse in childhood were between 0.6-4kg heavier than those who did not experience abuse as a child. In this sample, childhood abuse exposure predicted 8% of obesity cases where BMI classification was 30 or above. This figure was higher for BMI $\geq$ 40 with childhood abuse exposure predicting 17% of the variance. Whitaker et al. (2007) found that children who were obese were 1.5 times more likely to have experienced neglect. This is concerning for adults, since obesity in childhood is a reliable predictor of obesity in adulthood (Guo et al., 2002; Whitaker et al., 2007). However, it is worth noting that whilst the above data shows the large association between ACEs and obesity, it also suggests that the issue is more complex and that there are certainly other factors at play.

There has been recent work that has suggested that it is not just abuse and neglect that have an association with obesity. Adverse Family Experiences (AFEs), a subset of ACEs that include discrimination, death of a parent, witnessing or victim of neighbour violence and financial hardship, have also been associated with obesity (Heerman et al., 2016; Isohookana et al., 2016; Lynch et al., 2016). Some studies highlight that the presence of two or more AFEs related to a 1.45 to 1.8-fold increased risk of having obesity (Heernan et al., 2016; Lynch et al., 2016). Prevalence rates for obesity in adolescents who experienced two or more AFEs are up to 20.4% compared to 12.5% of those who experienced no AFE (Heernan et al., 2016). Isohookana et al. (2016) found that parental unemployment significantly increased the risk of not only obesity, but also of being underweight. In a sample of 449 adolescents between the ages of 12 and 17, a 3.5-fold increased risk of having obesity and 3.6-fold increased risk of being underweight was associated with parental unemployment. This has

significant implications for the role of socioeconomics in the precipitation and perpetuation of obesity in society. Within this study, however, the above figures regarding parental unemployment only relate to girls' participants. Furthermore, girls who experienced sexual abuse had a 2.6-fold increased risk of being obese but there was no association between ACEs and BMI for boys.

The presence of ACEs has a significant impact on the prevalence of obesity throughout the lifespan, however it is important to note that most of the evidence provides correlational associations (Danese & Tan, 2014; Gardner et al., 2019; Power, Pereira & Li, 2015; Williamson et al., 2002). For example, ACEs predict obesity risk in early adolescents (Gardner et al., 2019). In their study, Gardner et al. (2019), analysed data from a cohort of 6942 adolescents with the primary outcome measure being weight at 13 years old. They found that exposure to any ACEs was associated with a 2.15-fold increased risk of being overweight or obese. Furthermore, exposure to ACEs was associated with a 0.202kg/m^2 increase in BMI. The problem does not stop in adolescents, however (Danese & Tan, 2014; Power, Pinto & Li, 2015; Williamson et al., 2002). For example, data from meta-analyses show that the presence of ACEs lead to 1.36 times increased risk for obesity over the lifespan (Danese & Tan, 2014). Furthermore, people who experienced abuse as a child had a higher BMI as an adult compared to those who were not abused (Power, Pinto & Li, 2015). Populations used in these studies, however, are non-psychiatric populations and therefore their results may be different from individuals who are receiving psychiatric treatment, due to other factors that are also said to predict weight gain in those receiving this type of treatment.

There are wider socioeconomic reasons as to why people who are exposed to ACEs are more at risk of being obese (Bellis et al., 2016). People with ACEs have a poor diet, and this

may reflect the fact that those who have ACEs are from low socioeconomic status backgrounds (Allen & Donkin, 2015). There is literature to suggest that people from low socioeconomic status live in areas considered to be food deserts; areas that have limited access to nutritional food that is affordable (Burgoine et al., 2017). Furthermore, people from low socioeconomic backgrounds tend to have lower levels of health literacy and a reduced financial capacity meaning they may not be able to purchase fresh, healthy foods (Burgoine et al., 2017). These factors may explain the high prevalence for obesity in populations with ACEs.

Some individuals with SMI who have experienced trauma may be obese because they consume foods to aid dealing with the difficult thoughts and emotions associated with those experiences. Emotional eating (the tendency to eat in response to negative emotions) is a form of dysregulated eating and is associated with greater consumption of high calorie and fat dense foods (Litwin et al., 2017; Lowe & Maycock, 1988) and is a predictor of long-term weight gain (Hay & Roberts, 2008). The notion of emotional eating is supported by Psychosomatic Theory, which postulates that emotional eating is the result of two possible mechanisms; a poor ability to make distinctions between feelings of hunger, satiety and emotional arousal, or using food as a means to reduce emotional distress (Maras et al., 2016). The latter explains why people who engage in emotionally avoidant behaviour do so to avoid the distress associated with difficult thoughts and feelings. The Affect Regulation model for example, proposes that negative emotions trigger emotional eating which functions as an attempt to reduce negative emotions through a temporary distraction, emotional numbing and/or sense of comfort (Litwin et al., 2017).

Litwin et al. (2017) suggest that the feelings of immediate relief associated with eating rewarding food interferes with an individual's ability to learn and implement other adaptive strategies for coping with negative emotions. On this basis, it has been proposed that negative reinforcement occurs that maintains the conditioned response of eating to cope with negative emotions (Hayes et al., 1996). Therefore, dysregulated eating behaviour may be perpetuated by the reward signals associated with consuming high amounts of fat and sugar (Martel & Fantino, 1996). Furthermore, emotional eating patterns may explain why there are significant associations between the presence of symptoms of mood disorders and obesity (Black, Goldstein & Mason, 1992; Lazarevich et al., 2016; Petry et al., 2008; Schulz & Laessle, 2010; Stanley et al., 2013).

2.6.1.1 Summary

- Many people with SMI and who are inpatients within secure psychiatric services have been exposed to ACEs (Booth & Stinson, 2015; Dolan & Whitworth, 2013; Glasser at al., 2001; Stinson, Quinn & Levenson, 2016).
- Section 2.6.1, above, shows that there is a significant body of evidence to suggest that exposure to ACEs can lead to health harming behaviours, some of which are associated with the onset of obesity.
- The literature also suggests there is a dose dependent relationship in terms of ACEs and obesity, in that the more ACEs an individual is exposed to, the more likely they are to be obese (Bellis et al., 2016; Felitti et al., 1998).

2.6.2 Trauma and Attachment

As suggested in section 2.6.1 above, early traumatic experiences can have marked effects on the developing brain and have implicated in the development of mental illness (Geuze et al., 2005; Teicher & Samson, 2016). As a result of these experiences, many people experience difficulties in establishing strong and healthy emotional connections with others. In attachment theory, this is referred to as insecure attachment. Having an insecure attachment has increased prevalence in SMI groups (Harder, 2014) and obesity (Anderson et al., 2012; Anderson & Whitaker, 2011; Maras et al., 2016) and is highly prevalent amongst secure inpatients (Timmerman & Emmelkamp, 2006). The following section will give an overview of attachment theory, as well as presenting a review of literature pertaining to the association between attachment, secure psychiatric populations, and obesity.

2.6.2.1 Attachment Theory

Attachment theory is a psychological model that describes the dynamics of long- and short-term interpersonal relationships. The theory has been outlined by Carr and McNulty (2016). A secure attachment is made when a child is exposed to caregivers who are accommodating and responsive to their needs for security and being physically cared for (Carr & McNulty, 2016). In this instance, the child develops an idea of the care giver as a secure base in which to experience the world around them with confidence. Issues with attachment occur when there is a failure on behalf of the caregiver to respond to the needs of the child (Carr & McNulty, 2016). In this case, the child views themselves as insecure in the world and considers their caregiver as unreliable.

Attachment theory was postulated in Bowlby's (1988) seminal work and has been explored in-depth in the psychological literature since. This has resulted in the formulation of four recognisable attachment styles which include secure, anxious-preoccupied, dismissive avoidant and fearful avoidant (Batholomew & Horowitz, 1991). These attachment styles show continuity over the lifespan and include secure, anxious-ambivalent, anxious-avoidant and fearful-avoidant (Carr & McNulty, 2016). Terminology for attachment styles is different in children and adults, these differences are outlined below. For the purpose of this thesis, attachment styles will be referred to by their adult name.

Parents who offer a secure attachment for their children are aware of and are responsive to their child's needs. Later in life, an individual with a secure attachment style will have a greater ability to express personal autonomy and approach relationships with a sense of adaptability (Carr & McNulty, 2016). This differs substantially from those who have any of the other three attachment styles. Children who have an anxious-ambivalent attachment style have trouble following separation from their parents. In this case, where they are reintroduced with their parent, they do not experience a sense of comfort. Children with this attachment style may present as clingy and may have emotional outbursts. As adults, individuals with an anxious-ambivalent attachment style will present as preoccupied and as such, this attachment style in adulthood is referred to as anxious-preoccupied attachment. In a family dynamic, these individuals will lack boundaries and will strongly impose loyalty to the family, imposing strict rules in terms of conforming to the norms of the family which may be maintained through guilt or shame (Craddock, Church & Sands, 2009). This attachment style is primarily seen in individuals who have infrequent contact with their caregiver, such as separate parents.

Anxious-avoidant children will also experience issues with separation from their parents (Carr & McNulty, 2016). With this attachment style, the child will sulk and avoid contact with their parent after separation. In later life, individuals who are anxious-avoidant are distant or dismissive and may experience a family dynamic that is disengaged. In adults, this attachment style is more commonly referred to as dismissive-avoidant. This attachment style usually presents itself when the caregiver is rejecting of their child.

A child that has a disorganised attachment style will show patterns associated with some aspects of both ambivalence and avoidance. A child with this attachment style may have conflicting clingy and avoidance behaviours. Later in life, individuals with a disorganised attachment style may encounter approach-avoidance conflicts, whereby the individual struggles to pursue or avoid something that has both advantages and disadvantages. They may also experience a disorientated family dynamic. In adulthood this attachment style is referred to as fearful-avoidant. This attachment style is strongly associated with child abuse, neglect, parental absence and parental loss (Carr & McNulty, 2016). Furthermore, insecure attachment styles generally are associated with a higher risk of mental illness compared to individuals with a secure attachment (Cassidy, Jones & Shaver, 2013; Gumley et al., 2014; Harder, 2014; Rajkumar, 2014; Sheinbaum et al., 2015). Associations between attachment styles, SMI and secure psychiatric inpatients is discussed below.

2.6.2.2 Attachment, SMI and Secure Psychiatric Inpatients

Evidence suggests that a dismissive-avoidant attachment style is related to the presence of symptoms associated with psychosis, such as delusional thoughts, auditory hallucinations, paranoia and negative symptoms (Berry, Barrowclough & Weardan, 2008; Berry,

Barrowclough & Weardan, 2009; Berry et al., 2012; Gumley et al., 2014; Harder, 2014; Kvrgic et al., 2012; Ponizovsky, Nechamkin & Rosca, 2007; Ponizovsky et al., 2013). Harder (2014) highlights that dismissive-avoidant attachment patterns are present in 48-71% of people with psychosis, compared to 27% in healthy control participants.

Anxious-preoccupied patterns are seen less common in people with psychosis, with prevalence being reported between 12-20% compared to 19% for controls. In fact, more people who have psychosis have a secure attachment style with data suggesting prevalence rates are between 27-32%. This is compared to 58% for controls. Whilst the levels of fearful-avoidant attachment are still high in people with psychosis, they are less common than dismissive-avoidant attachment styles. Data suggests that the prevalence for fearful-avoidant attachment style in people with psychosis is between 29-35% (Harder, 2014). The prevalence rates for insecure attachment styles amongst those with a diagnosis of SMI has important implications for secure inpatients and it is likely that a significant proportion of secure inpatients have insecure attachment styles (Timmerman & Emmelkamp, 2006).

In fact, Timmerman and Emmelkamp (2006) explored the prevalence rates of attachment styles in secure inpatients and general population controls. They found that, compared to the general population, secure inpatients had a greater prevalence for a fearful-avoidant attachment style. In their sample, 39.5% of inpatients had a fearful-avoidant attachment style compared to 14.7% for the control group. The difference in prevalence rates for the other two attachment styles were still greater in secure inpatients, however these were not significantly different from the control group. This is non-surprising however, since fearful-avoidant attachment styles are associated with severe early trauma which in turn is associated with

poor mental health (Carr & McNulty, 2016) that may ultimately lead to treatment in inpatient facilities.

To explain the link between insecure attachment and SMI, Rajkummar (2014) proposes the Attachment-Developmental-Cognitive hypothesis. The authors' hypothesis suggests that representations of the self, of others and the ability to attribute mental states to oneself and others become dysfunctional because of early abuse and neglect. Exposure to these early experiences, as highlighted above, effects neural circuits and mesolimbic dopamine pathways. These issues are relevant to the formation of positive symptoms that are derivative of psychosis and schizophrenia. As a result of these neurological deficits, the adversely effected individual is sensitised to stress and lacks the ability to respond cognitively or emotionally. Rajkummar (2014) further proposes that this would lead to the development of delusional thoughts, hallucinations, and an inability to form deep and meaningful relationships with others. Whilst the author does not suggest that there is a direct causal relationship between ACEs, attachment and schizophrenia, Rajkummar (2014) merely points out that these issues can influence the risk of developing the disease, the severity of the disease and its prognosis. This is also the case for other mental illnesses such as personality disorders (Adshead & Sarkar, 2012; Agrawal et al., 2004; Lorenzini & Fonogy, 2013; Shaver & Brennan 1998; Westen et al., 2006; West, Rose & Sheldon-Keller, 1994).

For example, in their early study, Shaver and Brennan (1998) show that there were high prevalence rates for personality disorders in people with insecure attachment styles. In their sample of 1407 adolescents and young adults, they found that the 21% of people who had a personality disorder also had a fearful-avoidant attachment style, 15.2% had an anxious-preoccupied attachment style and 15.9% had a dismissive-avoidant attachment style. Overall,

47.9% had a secure attachment style. In terms of specific personality disorders, those with a fearful-avoidant attachment style were most likely to have a schizoid personality disorder. For anxious-preoccupied attachment style it was dependent personality disorder and for dismissive-avoidant it was also schizoid.

Agrawal et al. (2004) conducted a review of studies that explored the prevalence rates of borderline personality disorder and attachment styles. They found that in the thirteen studies included in the review, that every study revealed an association between the diagnosis of borderline personality disorder and insecure attachment styles. Attachment styles that showed the greatest association were anxious-preoccupied and fearful-avoidant attachment. This is supported by Harder's (2014) research that suggests the prevalence rates for a fearful-avoidant attachment style in people with borderline personality disorder is between 29-35%.

Westen et al. (2006) found in their review that dismissive-avoidant attachment was positively correlated with paranoid, schizoid, schizotypal, narcissistic and obsessive-compulsive personality disorders. Anxious-preoccupied attachment was positively correlated with borderline, histrionic and dependent personality disorders and negatively correlated with schizoid personality disorder. Fearful-avoidant attachment was positively correlated with paranoid, borderline and histrionic personality disorders. Secure attachment was negatively correlated with paranoid, schizoid, schizotypal, antisocial, borderline, narcissistic and avoidant personality disorders. Whilst the literature tends to make associations between insecure attachments and poor psychopathology, there is also the notion that a secure attachment is a protective factor against the onset of mental illness such as personality disorders (Meyer et al., 2001; Westen et al., 2006). In their study, Meyer et al. (2001) explored symptom changes in those with a range of psychiatric conditions such as mood and

substance misuse disorders, over one year following psychiatric treatment. The findings from a sample of 149 participants suggested that secure attachment was inversely correlated with the severity of psychiatric symptoms. Furthermore, secure attachment was also associated with greater improvements in global functioning and reduced anxiety levels after six months of psychiatric treatment (Meyer et al. 2001).

2.6.2.3 Attachment and Obesity

As highlighted in section 2.6.1, exposure to trauma in childhood is associated with poor health related behaviours later in life such as obesity. It would therefore be appropriate to propose that people with insecure attachment styles also have greater incidences for health-harming behaviours that would lead to obesity. In fact, there is an evidence base to show that attachment security in childhood and adolescents is associated with a higher BMI (Anderson et al., 2012; Anderson & Whitaker, 2011; Maras et al., 2016). Anderson and Whitaker (2011) aimed to estimate the association between attachment security in children aged two years old and their risk of obesity at four and a half years old. Their sample consisted of 6650 children and the prevalence for obesity was 23.1% in children that had an insecure attachment. This is higher than the 16.6% of children who have a secure attachment and who were obese. Furthermore, the odds of obesity in children who are insecurely attached was 1.3 times greater than those with a secure attachment.

Maras et al. (2016) conducted a study with a sample of 3,002 youths and found that insecure attachment was a reliable predictor of a higher BMI compared to people with a secure attachment. Anderson et al. (2012) highlighted in their study that the quality of maternal-child relationships predicts adolescent obesity. In their study with 977 participants, they assessed the quality of mother-child relationships over time. Insecure attachment was

associated with an increased odd of being obese as an adolescent. Diener et al. (2016) conducted a meta-analysis of studies exploring the association between adult and childhood obesity, and attachment security. They found a small association between attachment security and obesity in childhood; however, this was not statistically significant. They did, however, find a statistically significant association between adult attachment security and BMI.

When looking at specific attachment styles, literature does suggest that some insecure attachment styles are more prevalent in those with obesity. For example, D'Argenio et al. (2009) highlight in their research that explored attachment styles associated with obesity in a group of 200 participants that anxious attachment styles (encompassing anxious-ambivalent and fearful-avoidant styles) were more prevalent in obese individuals in their sample compared to non-obese individuals. Furthermore, Mazzeschi et al. (2014) found in their study that a fearful-avoidant attachment style played a significant role in childhood obesity. Furthermore, in patient's awaiting bariatric surgery there is a high prevalence of anxious attachment styles (Nancarrow et al. 2018). In their study, Nancarrow et al. (2018) explored differences in 195 patients waiting for bariatric surgery (mean BMI = 45.64kg/m2) and 195 age, sex and height matched controls (mean BMI = 24.47kg/m2). Their analysis showed that the bariatric group had significantly higher levels of anxious attachment compared to controls, however they also had significantly lower levels of dismissive-avoidant attachment. Furthermore, in a one year follow up, attachment style did not predict weight change in both groups. These findings highlight the multifactorial nature of weight maintenance.

There are several reasons why people with insecure attachment styles may be more at risk of developing obesity. For example, insecure attachment and high levels of ACEs are likely to result in increased orientation towards behaviours under aversive control: behaviours

orientated to move the person away from perceived threats or unpleasant stimuli including unwanted thoughts, feelings and memories (Amos, Furber & Segal, 2011; Hayes et al., 1996; Lewis, 2014; Vanwoerdan, Kalpakci & Sharp, 2015). In the Relational Frame Theory (Hayes, 1991) derived psychotherapy, Acceptance and Commitment Therapy (ACT), this is referred to as experiential avoidance (Shear, 2010). Experiential avoidance is maintained through negative reinforcement, in that short-term relief from distressing internal processes increases the likelihood that the individual will continue to engage in avoidance (Hayes et al., 1996). A review of experiential avoidance, and the role it may play in obesity within secure psychiatric settings, is explored in the next section.

2.6.3 Experiential Avoidance.

Experiential avoidance is an aspect of cognition that is expected to be evident in a range of conditions and circumstances related to psychological inflexibility. Psychological inflexibility, according to Relational Frame Theory, is the core process that underlies psychopathology (Hayes, Pistorello & Biglan, 2008; see Figure 2.2) and refers to the ability to diffuse from difficult thoughts and accept difficult feelings while persisting in values-based action (Lillis et al., 2009). As can be seen from Figure 2.2, there are a few processes that contribute to psychological inflexibility, with each of these processes emerging from characteristics of, and interactions between, human language and cognition (Hayes, Pistorello & Biglan, 2008).

Experiential avoidance is a cognitive process that is promoted by cultural beliefs surrounding feeling good and avoiding pain. In many cases, the avoidance of uncomfortable thoughts and feelings can sometimes exacerbate them (Hayes, Pistorello & Biglan, 2008). It is non-surprising then that there has been interest in understanding associations between

experiential avoidance and pathologies where you might expect psychological inflexibility and, specifically, experiential avoidance to be an issue. In fact, there is evidence to suggest that experiential avoidance is elevated in people who suffer from mental illnesses, such as; personality disorders (Hayes et al., 1996; Iverson, Follette, Pistorello & Fruzzetti, 2012; Jacob, Ower & Buchholz, 2013; Schramm, Venta & Sharp, 2013; Wheaton, Pinton & Wheaton, 2016; Yavuz et al., 2016), eating disorders (Cowdrey & Park, 2012; Fulton et al., 2012; Lillis, Hayes & Levin, 2011; Rawal, Park & Williams, 2010; Spinhoven et al., 2014), psychosis (Castilho et al., 2017; Varese et al., 2011) and mood disorders (Cribb, Moulds & Carter, 2006; Espejo, Gorlick & Castriotta, 2017; Kashdan et al., 2013; Kashdan, Morina & Priebe, 2009; Litwin et al., 2016; Spinhoven, van Hemert & Pennix, 2017; Vorontsova, Garety & Freeman, 2013).

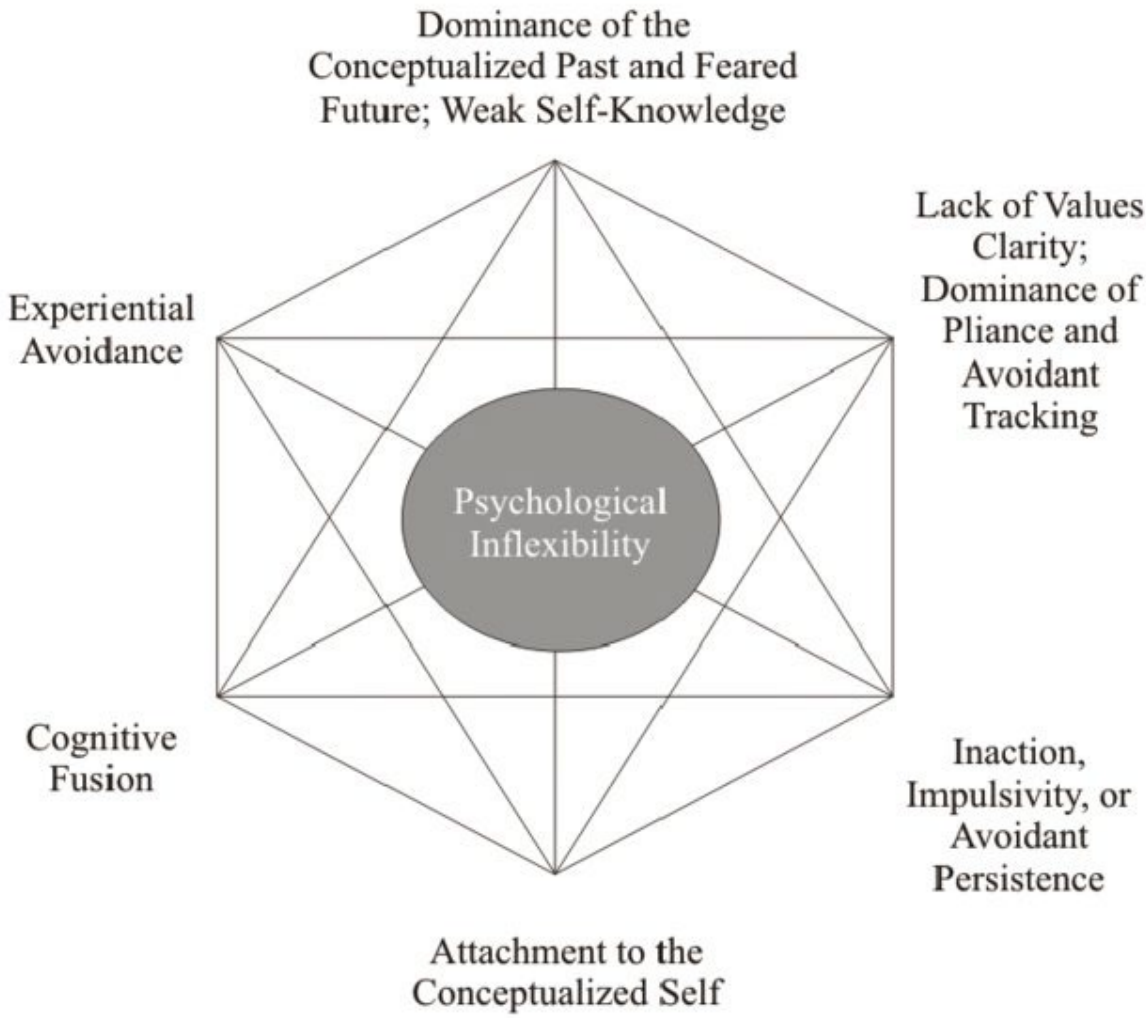

Figure 2.2. Psychological Inflexibility Model. *Note.* Hayes, Pistorello and Biglan (2008).

Experiential avoidance is also implicated in several poor health behaviours and is a reliable predictor for the proclivity to smoke, use substances and have a high body mass (Lillis, Hayes & Levin, 2011; Lillis, Levin & Hayes, 2011). The association between experiential avoidance and unhealthy weight is further strengthened by studies that show the efficacy of ACT based interventions (that focus on reducing experiential avoidance) on tackling obesity (Lillis et al., 2009; Tapper et al., 2009). In their study, Lillis et al. (2009) used an ACT based workshop targeting obesity-related stigma with an emphasis on reducing experiential avoidance. In this study, 84 participants were randomly assigned to either the

ACT workshop or a control condition. They found that after three months the ACT group experienced significant improvements in BMI. Pre-test the ACT groups mean BMI was 33.59kg/m^2 compared to 32.50kg/m^2 for the control group. Three months follow up data show that the ACT groups mean BMI reduction was 0.40kg/m^2 compared to a 0.20kg/m^2 increase in the control group. A similar study was conducted by Tapper et al. (2009) who also used an ACT-based weight management intervention. In their study, 60 participants were randomly assigned to the ACT intervention or control group. The ACT group's mean BMI at baseline was 31.8kg/m^2 compared to 31.3kg/m^2 for controls. The analysis found that there were no significant differences in BMI between groups at 6 months. However, when the researchers extracted data from participants who stated that they never applied the principles of the ACT intervention at 6 months, the results showed that there was a 0.92kg/m^2 reduction in BMI. This was significantly different from the control group who lost 0.04kg/m^2.

Much larger reductions in BMI were seen in a paper by Niemeier et al. (2012). They conducted a pilot study testing the efficacy of a six-month ACT based weight management intervention for 21 overweight and obese individuals who reported difficulty with eating in response to emotions and thoughts. Participants had an average BMI of 32.8kg/m^2. Three-month follow up data showed that participants lost an average of 4.4kg/m^2, which surmounted to 12.1kg in weight. Greater weight loss was associated with greater decreases in experiential avoidance. The effectiveness of these interventions may be explained by reductions of dysregulated eating behaviours that are associated with experiential avoidance (Palmeira, Cunha & Pinto-Gouveia, 2018; Lillis, Hayes & Levin, 2011; Litwin et al., 2016; Niemeier, Lillis & Wing, 2017).

2.7 Summary of Reviewed Literature

The review above highlights that weight gain and obesity is a significant issue for people with SMI. There are considerably greater prevalence rates among these populations compared to the general population. Obesity in this population has been used to explain co- and multi-morbidity of physical illnesses as well as early mortality. This issue is also highly prevalent within secure psychiatric services; hospitals used to treat patients with poor mental health and that are unmanageable in normal psychiatric inpatient facilities or in the community. It has been postulated that aspects of the secure service environment itself, such as easy access to high calorie foods and restrictions of movement, may be contributing to the high levels of obesity seen in this population. There are also several cognitive, clinical, and psychological factors that have been proposed that contribute to weight gain and obesity within secure psychiatric inpatients (see Figure 2.1).

For example, it could be proposed that due to the rewarding properties of food, patients may unconsciously allocate a greater amount of attention to food items that are highly palatable. These foods are often high in fats and sugars. This may be further enhanced when the environment is highly restrictive, where access to outdoors and exercise activities is limited. The reviewed literature also proposes that obesity may be further perpetuated in those who allocate greater amounts of attention towards palatable foods, when they have difficulties with inhibitory control. This is a common issue amongst people with SMI and may explain the high prevalence for obesity amongst patients with schizophrenia and/or personality disorders; mental illnesses that are highly prevalent within secure services.

The primary course of treatment for individuals with SMI is the use of psychopharmacology. The reviewed literature highlights that specific antipsychotic and antidepressant medication is associated with significant increases in weight during the initial stages of their use. Since individuals with SMI experience a number of co-morbid physical illnesses, these people are also prescribed medication to manage physical health symptoms. Much like psychotropic medication, many of these physical health medications are also associated with excessive weight gain.

The reviewed literature above has highlighted the high prevalence of trauma amongst SMI and secure psychiatric populations. These ACEs are strongly linked with health harming behaviours such as eating a poor diet and is associated with obesity. Experiencing trauma in early childhood can result in having an insecure attachment style later in life; a psychological process that is implicated in SMI and obesity. People with ACEs and/or who have insecure attachment styles may engage in behaviours under aversive control to avoid the difficult thoughts and feelings that arise from these early experiences. As such, this 'experiential avoidance' has been associated with obesity and many weight management interventions aim to reduce levels of experiential avoidance to promote and maintain a healthy weight.

What follows in this thesis is a write up of three work packages (Chapters 4, 5, 6 and 7) that have been conducted to explore potential factors that evidence suggests should exacerbate obesity in secure inpatients, these work packages are preceded by an overview of the methodology used to conduct these work packages (Chapter 3).

Chapter 3: General Methodology

3.1 Methodological Considerations for Design and Conducting Research in Secure Psychiatric Services

The current project has three work packages (inclusive of four studies) that have been conducted across three secure psychiatric inpatients services located in South Wales. There are inherent challenges to conducting research in real-life, niche, clinical settings and this has led to a pragmatic approach to research design being adopted in this project (Salkind, 2010). All studies within this thesis were designed to make the best use of the information that has been captured during routine or historic record keeping within the services. This has particularly impacted work package 1 where change in body weight (in kilograms) was used as a dependant variable rather than BMI. This was because there was a large portion of medical records that did not record BMI or include information that could be used to calculate BMI (records documented weight but did not include details on the height of patients). The difficulty in obtaining the most appropriate data from record keeping within the services led to a mixed methods design being adopted in this thesis. This approach is valuable as it enables the research to consider the issues of obesity both from clinical and experimental data but also ensure that results are grounded in patients' experiences (Agency for Healthcare Research and Quality, 2013). Due to the restricted pool of participants within some analyses in this thesis, compromises have been made for in terms of statistical power as many statistical techniques are dependent on larger sample sizes (see work package 2).

Other difficulties that arise when conducting research in secure environments include the risk that there will be low motivation for patients to participate in the research (Bixo et al., 2019). To overcome this issue a key aim in this project was to make taking part as easy and

non-intrusive as possible, particularly when selecting relevant study measures for each of the work packages. For example, in work package 2, to be able to explore weight differences over time, weight measurements were taken from participants. Waist circumference is considered a reliable and robust measure of weight gain (Bener et al., 2013), however it was felt that this method of measuring weight change is intrusive and could be problematic for patients who are sensitive about their weight. As a result, a less intrusive method of weight measurement, i.e., weighing participants with a weighing scale, was used. This weight measurement was then used with patient height to calculate their BMI (in work package 2).

Another way to make participation as easy as possible for patients was to, where possible, use short-form versions of questionnaires (see work package 2). This reduced the amount of time patients spent completing the measures. Other studies materials were made as accessible as possible for patients that participated in the current project. For example, all introductory letters, information leaflets and consent forms were designed with feedback from a psychiatric inpatient service user focus group (Swansea Bay University Health Board). This group was used to assess the accessibility and clarity of study materials.

The burden of participation for patients was further reduced in work package 3, where data pertaining to staff views on weight management within secure services was collected, instead of using patients. It was also felt that using this method would not overexpose patients to topics such as their weight, as this may be a sensitive area of discussion. Engaging patients in lengthy discussions that largely focus on the negative aspects of their physical health and their lived environment may be detrimental to their well-being. This is not to mention the likelihood of burn out from participation in several research studies; the risk of

burn out is high in this population as it is exacerbated by psychotropic medication and mental ill-health.

3.1.1 The Researcher's Role within the Service

The current thesis is supported by a Knowledge Economy Skills Scholarship (KESS-II). These funded doctoral research projects link companies and organisations with the higher education sector to collaborate on applied research projects. As such both the higher education facilitator (i.e., Cardiff Metropolitan University) and the partner organisation (i.e., Swansea Bay UHB) contributed to the planning of the research. However, one of the stipulations of this funding arrangement is that the researcher dedicates a portion of their time to working at the partner organisation. Therefore, as well as conducting research, the researcher held a practitioner role within the services and had regular face-to-face contact with several patients. As a result of this, the researcher implemented safeguards against patients feeling obligated to take part (see section 3.3.2.1). The researcher also ensured that they had no contact or communication with patients regarding the research project until individuals were fully aware of the requirements of the studies.

3.2 Sample

The study sample for the project were recruited from patients (both current and historical) and staff members from one medium and two low secure psychiatric units within South Wales. Secure psychiatric settings, as outlined in Chapter 1 (section 1.1.2) are services that treat mentally unwell individuals who either have committed an offence or pose a danger to themselves or others. The secure nature of these settings mean that patients have less freedom and have greater restrictions in terms of their ability to leave the service at their own will.

Patients may be placed in a medium secure service if their risk or behaviour may be considered unmanageable in placements of low security, where there are fewer staff and fewer restrictions, or not deemed significant enough to warrant placement in a high secure service which have greater numbers of staff members and greater restrictions on patient's freedom.

3.3 Ethical Considerations

The current project included three different work packages, with several studies included therein. Experimental protocols for all work packages in this project were reviewed by Abertawe Bro Morgannwg University Health Board (ABMUHB; now Swansea Bay UHB) Research and Development Department (R&D) and Cardiff Metropolitan University School of Health Sciences Ethics Committee. The NHS ethical approval framework stipulates between different types of studies, for which there are different ethical approval procedures. The current project included several different types of study design, these were a clinical audit (work package 1), research (work package 2) and service evaluation (work package 3), all of which require different levels of approval by R&D. Definitions for these study types are presented in Appendix A.

3.3.1 Ethical Considerations for Work Package 1.

Work package 1 comprises one study that was an audit of inpatient medical records. This study was viewed by the NHS R&D as a clinical audit on 19/03/2018. As a result, the study did not require full NHS ethical approval and consent was not needed from patients to access their medical records. The information collected for this study was gathered over the 14-year study period as routine for clinical treatment purposes. Service users' age, sex, psychiatric

diagnoses, prescribed medication, prior substance misuse and length of contact with psychiatric services until admission were extracted from these healthcare records of patients who were admitted between 2004 to 2018. To make sure data was anonymous, a data sheet was designed that allocated a unique study number to each healthcare record. This was only available to the study team. No patient identifiable information was recorded in the data sheet. Information was made as generic as possible in order to reduce the risk of identifying individuals. The data sheet is held in a unique password folder on the ABMUHB intranet M: drive. A list that matches study numbers to NHS numbers is held separately from the data sheet and is saved on the ABMUHB intranet M: drive within a password protected folder. No patient identifiable information was removed from NHS premises. The study data was made available to academic partners under the KESS 2 contractual arrangements.

3.3.2 Ethical Considerations for Work Package 2.

Work package 2 is comprised of two experimental studies. Data was collected for both experiments at the same time point and subsequently participants were recruited from the same participant pool. As this work package used experimental measures a full NHS ethical approval was required. To achieve this, a study application was made through the Integrated Research Application System (IRAS) which was reviewed by a local, NHS approved ethical committee (Local Research Ethics Committee 2, Wales) and Health Care Research Wales (HCRW). The study was independently reviewed by both bodies before being approved on the 13/11/201.

There were several specific issues around informed consent which were relevant to the design of work package 2. These included participants who were a particularly vulnerable group and who were detained under the Mental Health Act (1983) and therefore may have

been at risk of being unable to provide informed consent. Mental capacity is a decision specific concept, and therefore work package 2 only recruited individuals who were deemed to have capacity to decide to participate (or not and were able to retract their consent at any stage in the study). To ensure potential participants were able to give fully informed consent, Responsible Clinicians were approached and asked to nominate patients who they considered would be a) able to give informed consent or refusal to participate (i.e., are not overly suggestible) and b) were sufficiently clinically stable such that participation in the study would not be likely to have any adverse effects on their wellbeing. Potential participants were offered written or verbal information about the study through their primary nurse or psychologist. Patients who expressed an interest in participating in the research were sign posted to the researcher, who arranged an appointment to meet and discuss participation and obtain informed consent. The recruitment process for this study was conducted over several stages and is outlined in Table 3.1, below.

Table 3.1.
Recruitment process for work package 2.

Stage of recruitment	
Stage 1	Responsible Clinicians (RC) were contacted and given details of study and participant inclusion/exclusion criteria. A letter was then sent to the RC with instructions going forward (see Appendix B).
Stage 2	Nominated potential participants were given written information about the study (see Appendix C) and an invitation to meet the researcher (see Appendix D) by their primary nurse or psychologist.
Stage 3	Potential participants who agreed to meet the researcher were offered an initial appointment where further information about the study and their rights to withdraw at any time are given. They were also asked to provide informed consent through signing a consent form (see Appendix E). A further appointment for data gathering was then arranged.
Stage 4	Consenting participants underwent a one-hour appointment in which the following information was gathered: i) Weight and height were measured by a familiar member of ward staff without the researcher present. ii) Participant completed the VDP (20 minutes) and a measure of hunger. iii) Participant's sex, age, placement security and prescribed medication were recorded in a questionnaire study pack (see Appendix F). Participants then completed this study pack which contained: short mood and hunger questionnaire, Brief Experiential Avoidance Questionnaire (15-items), Three Factor Eating Questionnaire-18 (18-items), The Relationship Questionnaire (4-items), Delaying Gratification Inventory food subscale (7-items), and the ACE tool (10-items).
Stage 5	Three to six months follow up session: participant's weight was repeated.
Stage 6	Results feedback session. Participants were offered verbal or written information about the outcome of the study if they wished to receive it at the end of the study.

When designing this work package, it was also important to acknowledge that patients within the service may have fluctuating capacity. For data collection to proceed, at the time of data gathering participants had to be deemed to have capacity. The researcher also checked that the participant comprehended the information by asking them to repeat back what they understood. It was planned that if they lost capacity and then at a later date regained their capacity and at that point they decided to withdraw from the study, then their data would then be removed. If at follow up, participants were deemed to lack capacity to consent to participate, then the researcher would wait for them to regain capacity before including their data in the study. If participants did not regain capacity before the final date at which follow up data was being collected, the researcher planned to discuss with the Responsible Clinician whether it would be appropriate or necessary to withdraw the participant from the study or whether it would be reasonable and legitimate to retain their data that had been collected so far.

3.3.2.1 Confidentiality

Another important ethical consideration for work package 2 was that of patient confidentiality: potential participants could have had a high media profile due to their offending history or may have been particularly easy to identify from basic demographic and offence related information, and those potential participants who declined to take part were not made known to the researcher. To ensure confidentiality, the researcher was not given names of individuals until the point where they have agreed to meet the researcher. All participants were allocated a unique study number. Personally identifiable data gathered for the study (i.e. participant's name, date of birth and hospital number) were kept on a list against the unique study number which was stored on a secure NHS intranet site by the company supervisor. Only the unique study number was associated with participant study

data which was stored in the University. The personally identifiable data was not taken out of the research site and was destroyed following analysis.

Where personal information was obtained from collaborating private sector units, this information was transferred electronically in an encrypted document using secure email (CJSM accounts) between the private sector unit Principal Investigator and the NHS Chief Investigator, where the unique study number was allocated. All physical participant data was securely locked in a filing cabinet within an NHS medium secure facility. Electronic data was also collected from NHS inpatient facilities and an independent sector secure inpatient facility. This was stored on an encrypted, password protected university issued portable computer which was carried in a locked brief case between sites.

All data was anonymised using a unique study number. Routinely collected clinical data used in this study was classified in generic categories to prevent rare and easily identifiable information to be anonymised, e.g., rare clinical conditions or offence details that may be in the public domain resulting from past media coverage. Outside of the direct care team, the only person to access personal data was the researcher. Data analysis was conducted by the researcher. Analysis was conducted in a private place on an encrypted computer. Personal data was stored for 3 months after the study has ended. The researcher asked participants if they wanted to receive information about the results of the study. Also, an easy read report was prepared that could be shared with service users and service user organisations. The results were also shared through presentation at service user conferences.

3.3.2.2 Potential Risks to Patients and Researcher

There were several potential risks identified within the data collection period that may have impacted on participants completed work package 2 or 3 and/or the researcher.

2.3.2.3.1 Patient Risk

Participants were a vulnerable group of people by virtue of their detention under the Mental Health Act, as such some participants may have had fluctuating levels of clinical stability and capacity to give informed consent. To deal with this issue, the researcher liaised with clinical teams to ensure that, on the day of data collection, participants who had previously consented were still able and willing to participate. Participant information was provided that made clear that participation was entirely voluntary and non-participation would have no effect on their subsequent care and treatment. Despite these risks, there were several benefits identified for participation. In general, patients in these settings welcome opportunities to help others and take part in interesting research activities. The issues of interest in this work package are matters of concern for many patients who find themselves gaining weight and it affecting their body image and self-esteem. By participating in this study, they may have viewed themselves as contributing to potential improvements in care and treatment for individuals like themselves. The timeframe required for data collection meant that participants may be sedentary for up to an hour when completing the study tasks. To negate this, short breaks were provided to prevent fatigue, and data collection, where necessary, was split across two sessions.

2.3.2.3.2 Risk for Researcher

Patients within the services included in this project are living with complex vulnerabilities and so there was a risk of violence within the setting. There are also indirect risks of working with people with psychological trauma. These risks were mitigated by clinic policy and training (i.e., break-away training), but also by liaising with ward staff and clinical teams before and after meeting with participants. The research also had ongoing clinical supervision from clinical professionals within the setting. Any meetings with participants were conducted in an area of visibility, in line with their prescribed observation levels whilst also maintaining privacy and confidentiality for the participant.

2.3.2.4 Management of Sensitive Topics

Discussing weight gain may be a sensitive topic for some participants. The information sheets provided to participation in work package 2, clearly set out the topics that were to be explored and made clear that consent to participate could be withdrawn at any time. It was also possible that participants could potentially disclose clinically significant information during data collection session. Although it was made clear that the session was confidential, it was emphasised that if participants provided any personal information that placed their own (or others) health and wellbeing at risk, or the safety of others at risk then this would need to be shared with ward staff. Any such disclosures that needed to be made would be discussed with the participant beforehand. In the unlikely event that participants became distressed during the data collection sessions, this was verbalised to ward staff.

3.3.3 Ethical Considerations for Work Package 3

The third work package included a qualitative study which involved interviewing staff members about their views of the management of patients physical health with secure services. This element of the project was granted ethical permission for a service evaluation on 13/05/2019. Swansea Bay UHB advised that a formal consent taking process was not necessary for this work package as consent was implied by participation. The study involved staff members completing a semi-structured interview (see Appendix G for interview schedule) which was recorded on a recording device. This recording device was not taken out of the organisation and was locked in a secure filing cabinet whilst not in use. No participant identifiable information was included on the interview recording.

3.4 Common Measures Used Within the Work Packages

3.4.1 Sociodemographic Data

In terms of sociodemographic data, patient's age and sex were captured in all studies included in work packages 1 and 2.

3.4.2 Pharmacological Data

The studies included in work packages 1 and 2 contained data regarding patient's prescribed medication. With regards to antipsychotic medication, the Maudsley Prescribing Guidelines in Psychiatry (13th ed: Taylor, Barnes & Young, 2018) were used to categorise antipsychotic medication in relation to their weight gain culpability. These categorisations include high, moderate or low risk of weight gain. All other medication included in these

studies were categorised as either high or low risk of weight (based on research conducted by Grootens et al. (2018), Kyle & Kuehl, (2016) and Saunders et al. (2016)).

3.4.3 Clinical Data

Clinical data was collected from patient's medical records. This included information about the individual's psychiatric diagnoses (primary and, if applicable, secondary diagnoses). These diagnoses were categorised based on ICD-10 psychiatric disorders (WHO, 2004) (see Table 3.2 for overview). Data was also collected on whether patients had a history of substance misuse prior to their admission. Data pertaining to patient's primary and secondary diagnoses, as well as their substance misuse history, was captured in work package 1. Furthermore, because there are differing levels of restrictions placed on patients within medium and low secure services, it was important to include details on the level of security each patient was placed in. This information was captured in the studies included in work packages 1 and 2.

Table 3.2.
Clinical data measurement

Variable	Category
Primary psychiatric diagnosis	Psychotic disorder Personality disorder Mood disorder Cognitive impairment disorder No Psychiatric disorder
Secondary psychiatric diagnosis	Psychotic disorder Personality disorder Mood disorder Cognitive impairment disorder Behavioural disorder No Psychiatric disorder
History of substance misuse	Yes No

3.4.4 Weight Data

Details of participants' weight were recorded in work packages 1 and 2. In work package 1, weight (in kilograms) was collected from patient medical records on admission and three months post admission. Where weight was not recorded in medical records at exactly three months after the admission data, weight was collected between eleven and 13-post admission. If weight data was not available between eleven and 13-weeks post-admission, patients were not included in the study. Unfortunately, as many of the patient records did not capture information on height; patient BMI could not be documented. Instead, in work package 1 participants body weight on admission was categorised as either underweight (bottom 40%), normal (41-59%) or overweight (top 40%) when compared to the general population by age and sex (Bodyscan, 2017).

In work package 2, patients' weight (in kilograms) was collected at study baseline using a weighing scale. Weight was collected again by the same method at three- and six-months post-baseline. Height was recorded in centimetres at baseline. Body mass index was calculated by dividing participant's body weight in kilograms by the root of their body height (kg/m^2).

Work Package 1

Chapter 4: The Role of Clinical, Demographic and Pharmacological Factors in Predicting Weight Gain in Secure Psychiatric Services.

4.1 Introduction

The literature highlighted in Chapter 1 shows that weight gain is a significant challenge for many individuals with SMI who are also treated within secure psychiatric settings (Day & Johnson, 2017; Laursen, Munk-Olsen & Vestergaard, 2012; Shin et al., 2002; Wetterling, 2006). Part of the reason why this group is at risk of excessive weight gain may be the side effects of prescribed antipsychotic medications (Leucht et al., 2013).

In 2017, the Department of Health noted that weight gain amongst SMI patients in secure services was a concern (Day & Johnson, 2017). Secure mental health inpatient services support patients who are detained under the Mental Health Act (1983), because of having severe mental health problems and/or offending histories (Hare Duke et al., 2018). Within these settings individual's freedom of movement, autonomy and choices are highly restricted. Lengths of stay in these hospitals tends to be longer than for other inpatient services (Sharma et al., 2015). The prevalence of individuals who are categorised 'long stay' within high and medium secure services is 23.5% and 18.1% respectively (long stay is defined as >10 years in high, >5years in medium and >15 years in a mix of high and medium secure settings; Hare Duke et al., 2018).

The prevalence of obesity is up to 80% higher in secure psychiatric settings compared to the general population (Day & Johnson, 2017). Estimates suggest that between 66% and 80%

of secure psychiatric inpatient populations are overweight or obese (Haw & Rowell, 2011; Long et al., 2014). In terms of prevalence rates by sex, males are more likely to be overweight, however females are more likely to be morbidly obese (Haw & Rowell, 2011). The reason for this sex difference is unclear. Haw and Rowell (2011) observed however that females in secure psychiatric settings are less motivated to engage in physical activities such as sport, compared to males.

The preceding literature review highlighted that the first 12 weeks of inpatient psychiatric treatment the period where many patients rapidly gain weight (Wetterling, 2006). During this time, it is common for patients to gain between three to five pounds a month in weight (Shin et al., 2012). Literature highlights that individuals who are most at risk of weight gain during this period are inpatients who have a low BMI on admission (Bai et al., 2009; Gentile, 2006; Hummer et al., 1995; Lau et al., 2016; Umbricht, Pollack & Kane, 1994). Weight gain is not only a risk for those that have a lower BMI on admission, however, as many secure inpatients who are overweight and obese upon admission continue to gain weight during their hospitalisation (Day & Johnson, 2017; Every-Palmer et al., 2018; Hilton et al., 2015; Huthwaite et al., 2017; Mat et al., 2014).

It is important that secure services develop a clearer understanding about what factors influence weight gain in their settings because people with SMI have a 20-year reduced life expectancy compared to the general population (Laursen, Munk-Olsen & Vestergaard, 2012). In the UK, the leading causes of death for this patient group are avoidable physical illnesses such as respiratory disease, heart disease and type II diabetes (Hennekens et al., 2005; Subashini et al., 2011; Tay, Nurjono & Lee, 2013). The risk of developing many of these physical health conditions is increased when people are obese (Hennekens et al. 2005;

Shrivastava & Johnston, 2010; Subashini et al., 2011; Tay, Nurjono & Lee, 2013). Excessive weight gain also has a psychological impact; it is also associated with a decline in body image, perceived fitness and self-image (Laursen, Munk-Olsen & Vestergaard, 2012; Monteleone, Martiadis & Maj, 2009). These may also impact patient's motivation to engage in physical activity.

One common explanation for the higher obesity rates in this population is that weight gain is a consequence of treatment for SMI. Most people admitted to secure mental health services have a diagnosis of psychosis derived disorders such as schizophrenia (Fazel et al., 2016). As a patient group these individuals are known to have additional complex needs related to their offending risk and treatment responsivity (Kennedy, 2002). Obesity risk in schizophrenia has been attributed to a complex interplay between polypharmacy, poor ability to self-regulate behaviour and low motivation. These factors make weight management particularly difficult within secure settings.

Weight gain in schizophrenia has commonly been conceptualised as a direct consequence of the medications used to control psychotic symptoms (Leucht et al., 2013; Kyle & Kuehl 2013). There are several antipsychotic drugs classified as high risk for weight gain including clozapine and olanzapine (Bobes et al., 2003; Covell, Weissman & Essock, 2004; Fleischhacker et al., 2009; Hummer et al., 1995; Krakowski, Czobor & Citrome, 2009; Leucht et al., 2007; Leucht et al., 2013; Leucht et al., 2017). These medications are usually administered as a last resort where other pharmacological treatment have not been effective (Ganguli & Strassnig, 2006; NICE, 2014a). In secure inpatient services, rates of clozapine prescribing can be as high as 27.5 (Stone-Brown et al., 2016).

Although it is not fully understood why these antipsychotics induce weight gain, it has been proposed that changes in body weight are a consequence of the medications affinity to block 5-HTC_{2C} receptors (Leucht et al., 2013). For example, Reynolds, Hill and Kirk (2006) highlight that blocking 5-HTC_{2C} receptors effects neurons in the hypothalamus that mediate leptin circulation, a hormone that is implicated in the feeling of hunger. Other psychiatric drugs that have a high risk of weight gain associated with their use are antidepressants such as tricyclic antidepressants and some selective serotonin reuptake inhibitors that include paroxetine (Kyle & Kuehl, 2013; Saunders et al., 2016). Early work proposes that use of these drugs has a significant influence on appetite because of increased noradrenergic activity (Garland, Remick & Zis, 1988).

Medication used to alleviate physical health symptoms may also lead to increased body weight (see section 2.5.2.3). Several anticonvulsant, antidiabetic, antihypertension, antihistamine (often used for their antipsychotic properties; Hosák & Libiger, 2002; Sajatovic et al., 2007) and steroid hormones were found to have a high risk of weight gain (Grootens et al., 2017; Kyle & Kuehl, 2013; Saunders et al., 2016). This may be a consequence of interactions between these drugs and metabolism (Marketou et al., 2017), insulin (de Gaspari & Guerreiro, 2010; Hollander, 2007) and neurotransmitters associated with appetite (Jørgensen et al., 2007; Ratliff et al., 2010).

Many people with SMI such as schizophrenia and bipolar disorder have deficits in inhibitory control, which may mean that they consume food in excess (Ethridge et al., 2014; Kelly et al., 2020; Orellana & Slachevsky, 2013). This is particularly relevant when these individuals use foods that are high in sugars and fats when they are experiencing low mood (Pack, 2009). The rewarding qualities of palatable foods may be used by individuals to

manage feelings of distress (Robinson & Berridge, 1993). These problematic eating patterns may explain why the incidence of obesity in people with mood disorders is high (Black, Goldstein & Mason, 1992**;** Lazarevich et al., 2016; Petry et al., 2008; Schulz & Laessle, 2010; Stanley et al., 2012). This is also relevant for individuals with a history of substance misuse (a common feature amongst secure psychiatric inpatients; Kraanen et al., 2011; Mueser et al., 2000), the increased access to food may serve as a replacement to illicit substances. This is likely because the reward pathways in the brain that are triggered when palatable foods are consume are analogous to those triggered when illicit substances are consumed (Seage & Lee, 2017). This may explain why when individuals with substance misuse history are admitted into inpatient care, they tend to rapidly gain weight (Hodgkins et al., 2004). Overeating in these individuals may also occur because of deficits in reward sensitivity, in that the reduced density of dopamine D^2 receptors in the brain (as a cause or consequence of because of substance misuse) means that individuals need to consume more food to receive the desired level of reward (Benton & Young, 2016; Blum, Thanos & Gold, 2014; Carter et al., 2016).

4.1.1 Summary

The above review highlights that obesity is a significant concern for secure psychiatric inpatients, however there is a gap in the literature regarding predictors of weight gain in this population. The literature above makes a case that pharmacological and clinical factors, such as medication and psychiatric diagnosis, may influence an individual's risk of developing obesity in secure settings (Gerlach, Loeber & Herpertz, 2016; Keck & McElroy, 2003; Leucht et al., 2013; Marder et al., 2004; Mather et al., 2008; Petry et al., 2008; Wildes, Marcus & Fagiolini 2006).

The aim of the current study was to explore what factors predicted weight gain over the first three months of admission. The participants for this study were a population of psychiatric inpatients resident in medium and low secure units in South Wales. This study documented participant's medication use, psychiatric diagnosis, substance misuse history, placement security and length of contact with mental health services. These data were collected retrospectively from medical records. As the first 12-weeks of inpatient treatment are known to be period of rapid weight change (Every-Palmer et al., 2018), measures of patient weight were recorded at admission and at 12 weeks post admission.

It was anticipated that patient's weight would change in the 12 weeks following admission into the service. It is also expected that patients who had a bodyweight on admission that is lower than average (compared to the general population) will gain more weight than those with normal and above average weight (Gentile, 2006). It was predicted that the highest weight gain would be seen in patients who were prescribed medication that has a high risk of weight gain (Leucht et al., 2013). It is also anticipated that psychiatric diagnoses that are associated with weight gain in the wider literature, such as psychotic and personality disorders (Gerlach, Loeber & Herpertz, 2016; Keck & McElroy, 2003**;** Petry et al., 2008; Marder et al., 2004; Mather et al., 2008; Wildes, Marcus & Fagiolini 2006), will predict weight gain in this sample. History of substance misuse is also expected to predict weight gain in this study, as it is in samples of psychiatric inpatients (Hodgkins et al., 2004).

Finally, it is s likely that the complex interplay between these pharmacological and clinical factors works additively to promote obesity in secure settings. It is predicted that statistical modelling will be able illustrate the predictive power of clinical, pharmacological,

and demographic variables in terms of weight gain in this sample of secure psychiatric inpatient.

4.2 Methodology

4.2.1 Sample

The study involved a retrospective analysis of clinical data recorded routinely for a cohort sample of inpatients who were treated in medium and low secure psychiatric services in South Wales. Participant data was collected from medical records of participants who were admitted between 2004 and 2019. The total number of records reviewed in this study was 298, however only records that included all the demographic, pharmacological and clinical data were included in analysis. From these records, 89 were excluded due to incomplete pharmacological data (n = 27) or clinical data (n = 14). Participants whose weight was not recorded on admission were excluded from this study (n = 48).

A total of 209 records were included in the final analysis, demographic information for the sample are summarised in Table 4.1. The majority of patients included in this study were male, with a mean age of 35 years old. Furthermore, the majority of patients were from medium secure services and had been in contact with mental health services for an average of 165 months.

Table 4.1.
Participant demographic information

Demographic Information	N
Sex	
Male	159 (75.7%)
Female	50 (23.8%)
Age	
Mean (SD)	35.4 (11.98)
Range	18-77 years
Placement security	
Low	74 (35.4%)
Medium	135 (64.6%)
Contact time with mental health services prior to admission (months)	Mean = 165.4 (SD = 126.2) Range = 0 - 621

4.2.2 Design

The current study was a retrospective cohort-regression study design. The target population were inpatients from Welsh medium and low secure services. There were several predictor and outcome variables. Age was a continuous variable measured in years at admission. Sex was a dichotomous variable with levels male or female. Patient placement security was a categorical variable with levels medium and low. Antipsychotic medication risk was a categorical variable with levels high, moderate, and low. Non-antipsychotic medication risk was a categorical variable with levels high and low. Primary psychiatric diagnose was also categorical with three levels: psychotic disorder, personality disorder, and mood disorder. History of substance misuse was a dichotomous variable with levels presence and no presence. Time was a repeated measures variable with two levels: admission and 12

weeks after admission. As patient height was not recorded in participant medical records, patient's admission weight was compared to the UK population by age and sex (Bodyscan, 2017) and then categorised as either underweight (bottom 40%), normal weight (41-59%) or overweight (top 40%). This variable is referred to as admission body weight category. The dependent variable in this study was change in weight over time captured in kilograms.

4.2.3 Materials

Patient medical records were utilised in this study. The medical records included physical and digital copies of care and treatment plans, peer review reports, nursing notes and medical charts. Relevant data was stored in an encrypted Microsoft Excel document and analysed using the Statistical Package for Social Sciences (SPSS version 24; IBM, 2016).

4.2.4 Procedure

All study data was extracted from participants medical records. Medical records were either physical documents which were kept in a secure filing room on site, or, electronic and kept on a secure health board or company intranet service. Medical records were examined to collect clinical data (i.e. admission date, age on admission, sex, primary and secondary psychiatric diagnoses', substance misuse history and contact time with mental health services prior to admission date). If a patient had repeated admissions to the inpatient service only the first admission period was included in the database to avoid duplication of participants as a source of bias. Participant nursing notes were used to document patient's weight on admission and weight 12 weeks post admission. If weight was not recorded at 12 weeks, the weight recording for one week previous or later was included instead. If weight records were not available for this timeframe (or had been collected only two weeks or more before/after

the 12-week point), the patients' data was excluded from the study. Medical charts were used to determine what type and dose of anti-psychotic and non-antipsychotic medications they were prescribed. All participant data was recorded in a Microsoft Excel document and encrypted. It was then anonymised prior to being transferred to the SPSS for analysis.

4.2.5 Method of Analysis

The current study utilised several statistical analysis methods. A repeated measures t-test was conducted to assess the difference in weight in kilograms on admission and weight in kilograms 12-weeks post admission. A one-way Analysis of Variance (ANOVA) was also conducted, to explore weight differences over the 12-week study period between individuals who were underweight, normal weight or overweight on admission. Furthermore, a backward regression analysis was conducted with age, sex, placement security, antipsychotic and non-antipsychotic medication risk, primary and secondary psychiatric diagnoses, history of substance misuse and admission body weight category as predictor variables. The outcome variable in this analysis was weight difference in kilograms from admission to 12-weeks post admission. Prior to this regression analysis a Spearman's rank-order correlation was run to assess the relationships between continuous and dichotomous variables (namely: patient sex, age, substance use history, non-antipsychotic medication risk, placement security) and weight difference in kilograms over 12 weeks.

4.3 Results

The majority of patients in this study had a primary diagnosis of a psychotic disorder (e.g., schizophrenia; 66.5%). Most participants had a history of substance misuse (59.8%). In terms of pharmacological data, most patients were prescribed high risk antipsychotic medication

(54.1%). Contrariwise, for non-antipsychotic medication, most patients were prescribed medication that was associated with a low risk of weight gain (54.1%). Participant clinical and pharmacological data are illustrated in Table 4.2.

Table 4.2.
Clinical and pharmacological characteristics of sample

Characteristics	N
Primary diagnosis	
Psychotic disorder	139 (66.5%)
Personality disorder	50 (23.9%)
Mood disorder	20 (9.5%)
Multiple psychiatric diagnoses	
Yes	102 (48.8%) (1.4%)
No	107 (51.2%)
History of substance misuse	
Yes	125 (59.8%)
No	84 (40.2%)
Prescribed antipsychotic risk	
Low	64 (30.65%)
Moderate	32 (15.3%)
High	113 (54.1%)
Prescribed non-antipsychotic risk	
Low	113 (54.1%)
High	96 (45.9%)

4.3.1 Assessing Weight Difference in Kilograms Over 12-Weeks

Table 4.3 outlines weight data for the current sample. The majority of patients in this study gained weight (67.9%). The overall mean weight gain was 3.8kg (SD = 7.9, range = -16.3kg – 30.7kg). Based on the weight average of the UK population by age and sex (Bodyscan, 2017), on admission, 70% of patients were overweight, compared to 8% for normal weight and 22% for underweight. Figure 4.1 outlines the difference in the number of patients within each bodyweight category on admission and 12-weeks post admission. In this sample, nine (20%) patients who were underweight on admission, became overweight post admission, whilst 15% moved into the normal weigh category. Eleven (65%) of normal weight patients became overweight after 12 weeks, whilst 1 patient (6%) became underweight. Two (1%) of patients who were overweight on admission became underweight after 12-weeks. Patients with a mood disorder had the greatest weight on admission and 12-weeks post admission. This diagnosis was also associated with the greatest mean increase in weight over the study period (mean = 4.1kg).

Table 4.3.
Weigh data for sample.

Weight data	Admission	12 weeks
Body weight	Mean = 95.4kg (SD = 22.6)	Mean = 99.2.kg (SD = 22.5)
	Range = 43 – 155.2kg	Range = 53.9 – 180.6kg
Weight category		
Underweight (N = 46)	67.9kg (SD = 8.9)	74.3kg (SD = 10.5)
	Range = 43 – 80.5kg	Range = 53.9 – 96.8kg
Normal weight (N = 17)	83.1kg (SD = 1.8)	87.5kg (SD = 5.9)
	Range = 80 – 96.6kg	Range = 74.6 – 99.9kg
Overweight (N = 146)	105.5kg (SD = 18.6)	108.4kg (SD = 19.8)
	Range = 67.4 – 155.2kg	Range = 59.3 – 180.6kg
Psychiatric diagnosis		
Psychotic disorder	95.1kg (SD = 21.8)	98.9kg (SD = 22.1)
	Range = 51.7 – 149.9kg	Range = 53.9 – 180.6kg
Personality disorder	94.3 kg (SD = 23.7)	97.8kg (SD = 22.5)
	Range = 43 – 149.1kg	Range = 57.0 – 146.9kg
Mood disorder	100.5kg (SD = 25.2)	104.6kg (SD = 25.7)
	Range = 60.3 – 155.2kg	Range = 60.3 – 156kg

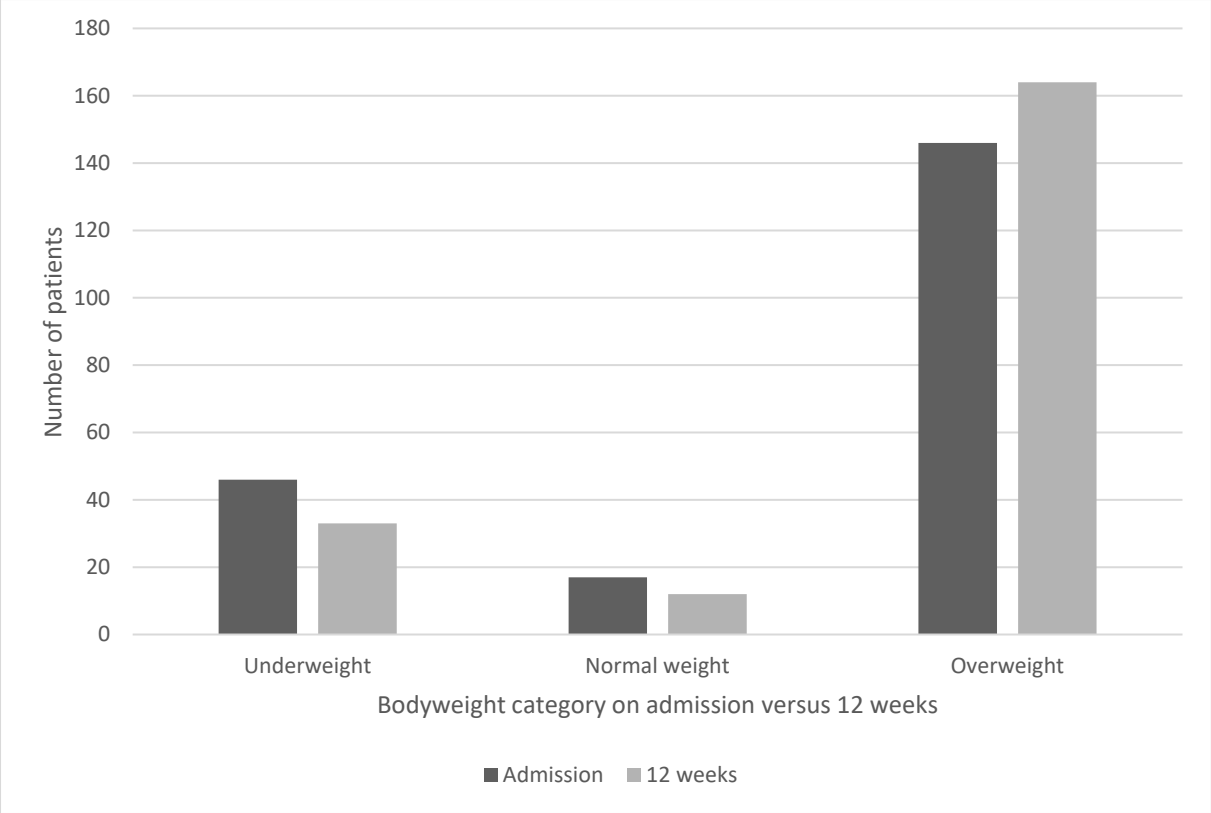

Figure 4.1. Number of patients in each bodyweight category on admission and 12-weeks post admission

A paired-samples t-test was used to determine whether there were significant differences in mean weight in kilograms on admission and mean weight in kilograms at 12-weeks post admission. In the data set seven outliers were detected that were more than 1.5 box-lengths from the edge of the box in a boxplot. Inspection of their values did not reveal them to be extreme and they were kept in the analysis. The assumption of normality was not violated, as assessed by visual inspection of a Normal Q-Q Plot. Participants mean weight was lower on admission compared to 12-weeks post admission. There was a statistically significant increase in mean (3.8kg, 95% CI [2.716, 4.857]), t (208) = 6.974, $p < .001$, $d = 0.48$). Figure 4.2 (below) illustrates the difference in weight (in kilograms) on admission and 12-weeks post admission.

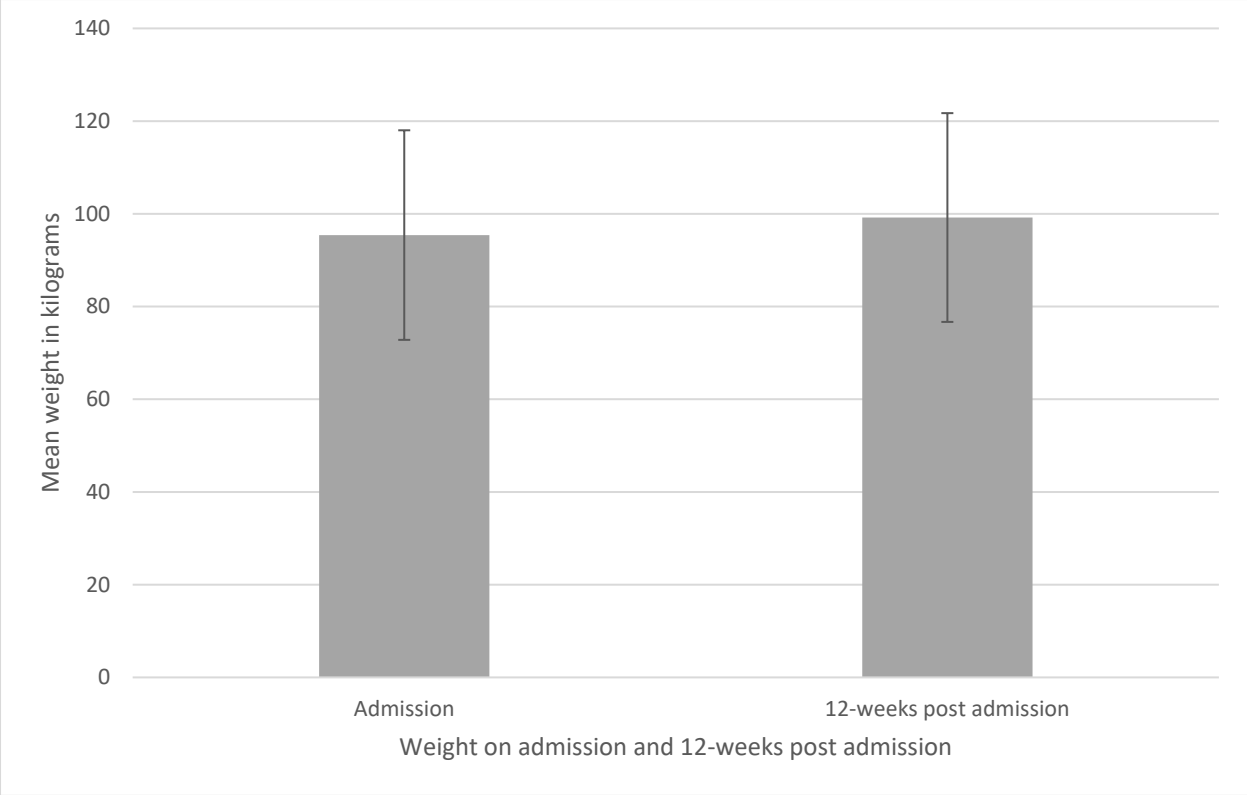

Figure 4.2. Mean weight (± SD) in kilograms on admission and at 12-weeks post admission.

4.3.2 Assessing Weight Difference over 12-Weeks between Admission Body Weight Categories

A one-way ANOVA was conducted to determine if weight difference at 12 weeks was dependent on classification of admission body weight category. Participants were classified into three groups: underweight (n = 46), normal weight (n = 17) and overweight (n = 146). Inspection of a boxplot identified 7 outliers; however, these were kept in the analysis. Data was normally distributed for each group as assessed through visual inspection of Q-Q plot and there was homogeneity of variances, as assessed by Levene's test for equality of variances (p = .703).

The one-way ANOVA was showed that there was an effect of baseline weight category on weight change at 12 weeks (F (2, 206) = 3.641, p = .028). The pattern of weight gain was different between the three groups; with the underweight weight group gaining more weight (M = 6.4kg, SD = 7.9) compared to normal weight (M = 4.4kg, SD = 6.6) and overweight participants (M = 2.9, SD = 7.8) (see Figure 4.3). Post hoc analysis with a Bonferroni correction showed that there was a mean increase from the underweight group and overweight group (3.1, 95% CI [0.41, 6.60]) which was statistically significant (p <.05). No other group differences were statistically significant.

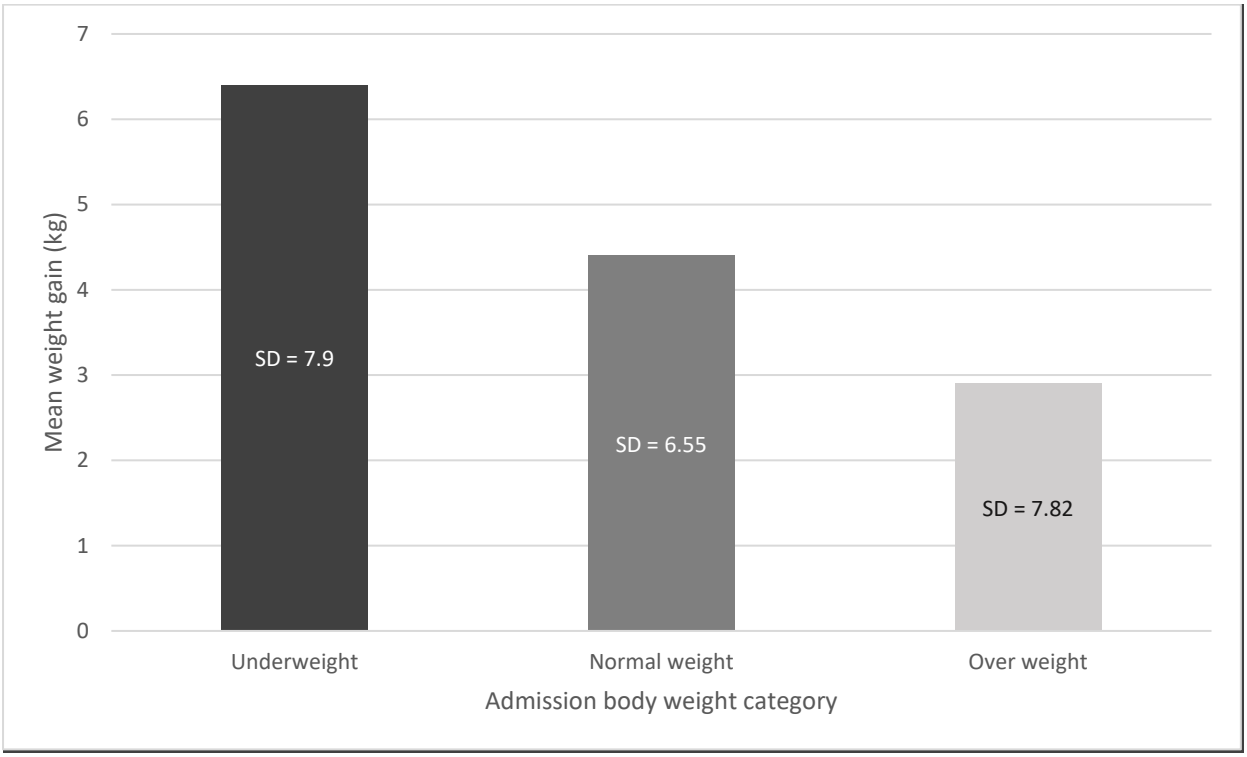

Figure 4.3. Mean (± SD) weight gain (kg) over a 12-week period based on admission weight category.

4.3.3 Predicting Weight Difference from Admission to 12-Weeks Post Admission

Spearman's rank-order correlations were run to assess the relationships between patient sex, age, substance use history, non-antipsychotic medication risk, placement security and weight difference in kilograms over 12 weeks. These are highlighted in the correlation matrix, below (Table 4.4). Preliminary analyses showed that the relationships were monotonic, as assessed by visual inspection of scatterplots. There was a statistically significant, weak negative correlation between non-antipsychotic medication risk and weight difference over 12 weeks, $r_s(209) = -.171$, $p < .05$.

Table 4.4
Correlation matrix for study 1.

	Age	Substance use history	Non-antipsychotic risk	Placement security	Weight difference
Sex	r_s = -.189** P = .006	r_s = .135 P = .051	r_s = .091 P = .191	r_s = -.265** P = .000	r_s = 0.15 P = .835
Age		r_s = -.018 P = .797	r_s = .078 P = .264	r_s = -.014 P = .838	r_s = -.088 P = .204
Substance use history			r_s = -.149* P = .032	r_s = .386 P = .097	r_s = .021 P = 759
Non-antipsychotic risk				r_s = -.261** P = .000	r_s = -.171* P = .013
Placement security					r_s = .066 P = .345

Note. * = p <.05, ** = p <.01.

A backward multiple regression was run to predict weight difference (in kilograms) between admission and 12 weeks post admission. The predictor variables were age, sex, placement security, antipsychotic and non-antipsychotic medication risk, primary and

secondary psychiatric diagnoses, history of substance misuse and admission bodyweight category. There was linearity as assessed by partial regression plots and a plot of studentized residuals against the predicted values. There was independence of residuals, as assessed by a Durbin-Watson statistic of 1.841. There was homoscedasticity, as assessed by visual inspection of a plot of studentized residuals versus unstandardized predicted values. There was no evidence of multicollinearity, as assessed by tolerance values greater than 0.1. There were two outliers, two studentized deleted residuals greater than ±3 standard deviations and one leverage value greater than 0.2. These cases were kept in the analysis, however. There were no values for Cook's distance above 1. The assumption of normality was met, as assessed by a Q-Q Plot. The predictor model included age, sex, placement security, antipsychotic and non-antipsychotic medication risk, primary and secondary psychiatric diagnoses, history of substance misuse and admission bodyweight category.

The resulting model was a significant predictor of 2.9% of the variance in changed body weight (F (1, 207) = 7.304, p = .007, adj. R^2 = .029). However, body weight category on admission was the only significant predictor remaining in the model (see Table 4.5). Table 4.5 shows that the lower the bodyweight on admission, the greater the weight difference is over 12 weeks.

Table 4.5.
Multiple regression results for weight difference over 12-weeks

Weight difference (kg)	*B*	95% CI for *B*		*t*	*SE B*	β
		LL	UL			
Constant	8.101**	4.782	11.421	4.812	1.648	
Admission bodyweight category	-1.741*	-3.011	-.471	-2.703	.644	-.185

Note. Model = "Backward" method in SPSS statistics; *B* = unstandardized regression coefficient; CI = confidence interval; *LL* = lower limit; *UL* = upper limit; *t* = *t* value; *SE B* = standard error of the coefficient; *B* = standardised coefficient.
*$p < .01$. **$p < .001$.

4.4 Discussion

The aim of the present study was to evaluate the predictive power of clinical, pharmacological, and demographic variables in terms of weight gain in secure psychiatric inpatients. Previous literature has suggested that rapid weight gain in psychiatric inpatients occurs in the first 12 weeks following admission (Wetterling, 2006). This was also true for the current study where participants gained an average of 3.8kg over 12 weeks. There was a substantial variance in the amount of weight gained in this study, with the range in weight gain being -16.3 to 30.7kg. In this sample, 32% of patients either maintained their weight or lost weight. The greatest decrease in weight over the study period was 16.3kg.

In this sample, 70% of participants were overweight on admission. Prevalence of overweight and obesity in this sample is different to rates documented in other studies (Hilton et al., 2015; Huthwaite et al., 2017; Mat et al., 2015). A higher rate of obesity was found in a study Huthwaite et al. (2017) who showed that 90% of their population of secure inpatients in New Zealand were overweight or obese on admission. This may be explained by the fact that the obesity prevalence in Wales (22.6%; PHW, 2019) is less than that of New Zealand

(30.9%; Ministry of Health, 2019). Contrarily, Hilton et al. (2015) showed in their study that 50% of secure inpatients were overweight or obese. It is not clear why there are discrepancies in weight on admission in this sample compared to previously published research, however the current study did not utilise BMI to classify if patients were underweight, normal weight or overweight on admission caution must be taken when interpreting data. Furthermore, in Hilton et al.'s (2015) study, the sample included patients from a maximum-security psychiatric hospital. Therefore, it is likely that access to food is more restricted than the medium and low secure inpatient services used in the current study.

In this study, the greatest level of weight gain was documented in participants whose body weight on admission was underweight (when compared to the UK population by age and sex; Bodyscan, 2017). When weight gain was compared between participants who were underweight on admission and overweight on admission this difference was statistically significant. Underweight participants gained 3.3kg more weight than patients who were overweight on admission. These results suggest that the lower the patient's admission weight the greater amount of weight they gain during the initial stages of treatment. These findings are consistent with patterns of weight gain documented in the non-secure psychiatric literature with several studies highlighting that it is patients who are underweight that gain the most weight when commencing treatment with antipsychotic medication (Bai et al., 2009; de Leon et al., 2007; Gentile, 2006; Hummer et al., 1995; Lau et al., 2016; Umbricht, Pollack & Kane, 1994). However, most underweight patients (66% of those classified as underweight on admission) remained within this body weight category at 12-weeks post admission. This may suggest that whilst underweight patients are more likely to experience the greatest amounts of weight gain during the initial stages of admission, the weight they gain may not be substantial enough to warrant sufficient concern. These findings suggest that we should be

cautious in inferring that weight gain is always related to obesity risk in this population, as underweight patients could be regaining body weight to make them a healthy weight, or indeed retain their current body weight status.

However, research has indicated that individuals whose body weight is in the healthy range are also at risk of gaining weight on admission to inpatient settings. de Leon et al. (2007) found that patients who had a BMI within the healthy range at the start of psychiatric treatment gained up to 4kg of weight over a 16-week period. This is comparable to the weight gain documented in this present study where participants who were of normal body weight gained on average 4.4kg (SD = 6.6) over a 12-week period. It may be that those who are normal weight on admission are of the greatest concern, because a large proportion of these patients in the current study became overweight after 12 weeks (70%). It is also prudent to note, that weight gain does not stop at 12 weeks, with some studies suggesting weight gain continues for at least six months of psychiatric treatment (Lamberti, Bellinier & Schwarzkopf, 1992; Meltzer, Perry & Jayathilake, 2003). It may be that underweight patient's weight continues to increase as their length of stay increases.

de Leon et al. (2007) found that patients who were overweight and obese on admission gained 3kg over 16 weeks, which is like the 2.9kg of weight gained by overweight participants in the current study. These results suggest that whilst those who are underweight are at the greatest risk of the biggest weight gain, overweight and obese patients are still at risk of gaining excessive amounts of weight. As suggested above, however, it is important to note that the current study did not use BMI as a measure of classifying admission bodyweight.

Findings from the current study also indicated that patient's bodyweight on admission significantly predicted weight gain (in kilograms) over a 12-week period. This finding is not surprising given that patients who were underweight and normal weight on admission were those who gained the most weight over the 12-week period. This is also consistent with broader psychiatric literature that has explored patient weight after commencing psychiatric treatment (Bai et al., 2009; de Leon et al., 2007; Gentile, 2006; Hummer et al., 1995; Lau et al., 2016; Umbricht, Pollack & Kane, 1994). However, in this sample, body weight category only explained 3% of the variance of weight gain, indicating that there are likely other factors implicated in weight change in this sample.

Contradicting the study's initial predictions, no pharmacological or clinical factors were predictive of weight change. This finding challenges many studies that have suggested that antipsychotic medications, such as clozapine and olanzapine, are significantly associated with excessive weight gain upon their use (Leucht et al., 2013). Certain physical health medications that are commonly prescribed to people with SMI (such as sodium valproate; Grootens, 2018; Kyle & Kuehl, 2013) are thought to be associated with substantial weight gain. These findings may reflect the limited variability in the sample regarding diagnosis and type of medication that was prescribed to patients. This sample's clinical characteristics and medication profiles were homogenous in that most patients had a diagnosis of schizophrenia and were prescribed high risk antipsychotic medication.

Obesity is also thought to be highly prevalent among populations with a diagnosis of a psychotic, personality, or mood disorder. Findings from this study suggest that patients with a mood disorder had the greatest admission weight, 12-week post admission weight and mean weight difference over 12-weeks. This is in line with research that shows individuals with

bipolar disorder have a high prevalence of obesity (Fiedorowicz et al., 2008). Fiedorowicz et al. (2008) highlight that 75% of patients with bipolar disorder were either overweight or obese. This is higher than the current sample where 55% of patients with a mood disorder were overweight or obese. Caution should be taken when interpreting these results, however, as the current study did not collect data on specific diagnoses (i.e., bipolar disorder) and instead a more generic classification of diagnosis was assigned to patients. It may be that many of the patients in the current study had a diagnosis of a mood disorder that is not associated with overweight or obesity, whereas bipolar disorder has consistently been associated with overweight and obesity (Elmslie et al., 2000).

Despite the high levels of weight gain documented in individuals who had a psychotic, personality or mood disorder, the current study found that clinical diagnoses were not reliable predictors of patient weight gain during the initial stages of treatment. Many of the participants in the current study (59.8%) had a history of substance use and this again did not predict weight gain. This conflicts with literature that suggested that patients who are admitted to inpatient services with a history of substance misuse experience rapidly gain weight (Hodgkins et al., 2004). These findings, as well as the fact that patient's admission body weight category only explained 3% of the variance of weight gain over 12 weeks suggests that there are other important factors that influence body weight in this setting that were not captured in the design of the current study. To date, there have been no published studies that have looked specifically at causes of weight gain in inpatients within a secure psychiatric service. Given the complex psychosocial history of patients within secure psychiatric settings it is plausible that their weight gain is the result of a complex interplay of psychological and cognitive factors contributing to excessive patient weight gain.

4.4.1 Limitations, Implications and Future Research

The current study has several limitations. In particular, the study utilised data from medical records which had varying degrees of detail, and which had been structured differently over the 6-year period. It may be that the inconsistent nature of record taking impacted on the reliability of the patient data collected. This limitation is largely due to the retrospective collection of the study data. Future research should look to explore the role that demographic, clinical a pharmacological factors have on secure inpatient weight using prospective cohort data, to negate this issue.

Due to the lack of data on patient height within these medical records, BMI could not be calculated and so the findings could not be discussed in terms of the most common classification of obesity. To negate this issue, the researcher categorised patients as either underweight, normal weight or overweight based age and sex matched UK weight averages. However, even with these categorisations, without height data it cannot be ruled out that weight gain seen in participants within this study was the result of lean body mass increase as opposed to fat increase. This seems unlikely however due to the restricted nature of the study environment, with limited access to gym facilities, particularly for those who were prescribed strong doses of psychotropic medications because of their poor mental health, as such activity would be considered risky. Unfortunately, in this study the methodological issues around data extraction could not be overcome because data was collected retrospectively. Further research should include participants height to have an objective measure of obesity, such as BMI. Without height data to calculate BMI, it cannot be ruled out that participants who were underweight were such due to a lower-than-average height and vice versa for those who were overweight.

The fact that patient diagnoses in this study were defined by health care professionals and not following use of research diagnostic instruments introduces some limitations of reliability. Psychiatric diagnoses are generally established by a health care practitioner through clinical interview and by consulting the ICD-10 (WHO, 2004). Ultimately, a psychiatric diagnosis given to a patient through this method is the interpretation of the diagnosing health care professional. Therefore, this method may lack objectivity. However, Jakobsen et al. (2005) explored the reliability of ICD-10 (WHO, 2004) diagnoses by comparing with a standardised diagnostic tool and found strong homogeneity between methods for diagnosing schizophrenia. In any case, it may be prudent in future research to explore use of standardised diagnostic measures completed with patients at the time of study to increase reliability and objectivity.

4.5 Summary

The implications for this study are for these settings, there appears to be a significant issue of weight gain for newly admitted patients. Furthermore, the patient group that appear to be most at risk of weight gain are those that are underweight on admission. It is worth noting that, whilst this patient group may be at a greater risk of gaining weight, because they are underweight, they are perhaps the least at risk of experiencing serious health implications as a result of this weight gain. As individuals who were overweight at admission still gained on average 3kg of weight over a 12-week period, weight gain in this group may be most likely to be detrimental to health and should be closely monitored.

This study highlights that there are likely to be other psychosocial or environmental factors that contribute to patient weight gain. It is imperative that further research explores other factors that are associated with weight gain in the obesity literature. As highlighted in

Chapter 2, there are several environmental (section 2.1 - 2.2), cognitive (section 2.4.1 – 2.4.2) and psychological factors (sections 2.6) which have been implicated in weight gain within non-secure psychiatric populations, a good starting point would be to explore if any of these are associated with weight gain in this population.

4.6 Key findings

- For newly admitted patients, weight increased by on average by 3.8kg over a three-month period.
- Patients who were underweight on admission gained more weight than those who were normal and overweight on admission. Normal weight patients gained more weight than those who were overweight.
- Admission body weight category was the only significant predictor of weight gain in this study, predicting 2.9% of patient weight gain in this study.

Work package 2

Chapter 5: Exploring Associations Between Attentional Bias, Dysfunctional Eating Behaviours, Delayed Gratification and Weight Gain in Secure Psychiatric Inpatients.

5.1 Introduction

The previous chapter explored the role that clinical, demographic, and pharmacological factors have on weight gain in secure psychiatric inpatient settings in South Wales. The study highlighted that these services had a high proportion of patients whose body weight places them in the obesity class II range. It also showed that patients on average gain significant amounts of weight between admission and the initial stages of treatment (12 weeks). Patients who gained the most weight on admission are those with a lower body weight and having a lower bodyweight on admission was the only significant predictor of weight difference over 12 weeks. However, the majority of these patients (66%) stayed underweight after 12-weeks, despite a mean weight increase of 6kg. It was noted that the majority (65%) of patients who were a normal weight on admission, became overweight after 12-weeks. Furthermore, there was a mean increase of 3kg for overweight patients, with 99% of patients who were overweight on admission being overweight 12-weeks post admission. It was anticipated that factors associated with weight gain in the SMI literature, such as medication and psychiatric diagnosis, would predict weight gain in this secure inpatient setting, however only body weight on admission was a significant predictor of weight gain. Moreover, this regression model only predicted 3% of the variance in weight gain over 12 weeks. Therefore, it is likely that there are other, more complex, and individual factors that may be contributing to patient's weight gain and obesity.

Within the general population, the obesity epidemic has been partially attributed to the widespread and largely unregulated marketing of high calorie foods (Access to Nutrition Initiative, 2020; Marks, 2015). Such environments are referred to as obesogenic as they promote overeating (Lake & Townsend, 2006). The secure psychiatric inpatient environment could be viewed as obesogenic as there is a high accessibility of unhealthy foods and a reduced capacity to engage in physical activity (Day & Johnson, 2017). Excessive energy intake and limited energy expenditure have been recognised by 'A Call to Action' (Day & Johnson, 2017) as contributing to patient weight gain and maintenance of obesity within secure settings. The literature reviewed in Chapter 2 makes a strong case for why environments that are abundant in high calorie foods or food cues can promote overeating and why individuals with poor top-down control may be more at risk of obesity. Chapter 2, section 2.4.1 highlights the role that attentional processing of food cues may have in the process of weight gain.

Those who are at risk of weight gain tend to be hyperresponsive to food cues in their environment (Schultes et al., 2010; Ulrich et al., 2013); this is proposed to be the result of dopaminergic conditioning which occurs when there is increased secretion of dopamine within the meso-cortico-limbic system in response to food cues (Broadley et al., 2019; Doolan et al., 2015; Field et al., 2016; Loeber et al., 2012; Menon & Uddin, 2010; Pelchat et al., 2004; Robinson & Berridge, 1993; Stice et al., 2008; Stice et al., 2010; Yokum, Ng & Stice, 2011). Dopaminergic conditioning of food cues increases their salience and therefore impacts on the desire and motivation to consume foods associated with high reward (Kemps, Tiggeman & Hollitt, 2014). Support for this theory can be seen in fMRI studies which have shown that obese individuals experience increased activation in brain reward circuits in response to food cues compared to normal weight individuals (Bragulat et al., 2010; Ely et

al., 2014; Kenny, 2011; Schur et al., 2009; Van Meer et al., 2016; Yokum, Ng & Stice, 2012). As an individual's weight increases, deficits in dopamine emerge within reward centres of the brain, particularly the striatum (Kenny, 2011). As a result of this reward hyposensitivity, individuals may overconsume palatable foods to experience reward (Kenny, 2011).

The propensity to pay heightened attention to salient food stimuli in the environment compared to neutral stimuli is referred to as attentional bias (see Chapter 2, section 2.4.1). Experimental studies have consistently illustrated that individuals who are hungry have higher attentional bias to food stimuli compared to individuals who are satiated (Gearhardt et al., 2012; Mogg et al., 1998; Stamataki et al., 2019). This means that when hungry, participants are quicker at identifying or responding to food stimuli, an effect that is consistent across a range of cognitive paradigms (Hendriske et al., 2015). This effect may lead to consumption of identified food stimuli, possibly even to excess (Werthmann et al., 2012).

Indices of attentional bias are higher on tasks that contain food stimuli that are high in calories (Hagan et al., 2020). These findings fit with the proposition that attentional bias evolved as a process to motivate individuals to seek out and consume high calorie foods within an environment where food is scarce (Nummenmaa et al., 2011). However, Castellanos et al. (2009) suggested that even when satiated, overweight and obese individuals are more likely to pay increased attention to food stimuli on cognitive tasks compared to those who have a lower BMI. Reviews of experimental studies that have compared the impact of body weight on responsivity to food cues, has shown that predominately those who are overweight or obese are quicker at processing high calorie food stimuli compared to those of health weight (Braet & Crombez, 2003; Castellanos et al., 2009; Doolan et al., 2014;

Hume et al., 2015a; Hume et al., 2015b; Kemps, Tiggemann & Hollitt, 2014; Long et al., 1994; Nijs et al., 2010a; Nijs et al., 2010b; Oh & Taylor et al., 2013; Schag et al., 2013; Werthmann et al., 2015).

It has been proposed that measuring responsivity to food cues in the environment could be a useful predictor of an individual's tendency to gain weight (Chapter 2, section 2.4.1). For example, Caltri et al. (2010) conducted a study using 102 normal-weight young adults (BMI = 23.32kg/m^2) to explore if baseline measures of attentional bias could predict weight gain over a 12-month period. This study found that attentional bias towards unhealthy food cues was predictive of weight gain; however, the mean increase in BMI over this period was small (0.32kg/m^2). To date the relationship between attentional processing of food cues and weight gain has not been explored in individuals with SMI.

Secure psychiatric inpatients live within an obesogenic environment where there is an abundance of food cues, many of which are high calorie (Day & Johnson, 2017) and it is also common for people with SMI to have trouble inhibiting behaviour. This places the patient group at increased risk of weight gain. However, the extent to which this impacts on attention to rewarding stimuli is unknown. Within secure settings most patients with SMI are prescribed antipsychotic medications (NICE, 2014a); these medications have been shown to reinstate functional attentional processing (Keedy et al., 2014). Although these may alleviate attentional deficits, it is unknown if restoration of attentional processing impacts on processing of environmental cues. As the secure setting is obesogenic, paying attention towards ubiquitous food stimuli could lead to patient weight gain as it is associated with an increased desire to consume available foods (Kemps, Tiggeman & Hollitt, 2014).

This is a significant gap in knowledge around the impact that attentional bias to food cues has on eating behaviour in populations with SMI (and even more so for patients within secure inpatient settings). It is possible that this limited knowledge base is in part due to methodological difficulties which are inherent in conducting cognitive research in secure populations. For example, patients may have low motivation to participate in research (Bixo et al., 2019), and fluctuating levels of clinical stability (Baca-Garcia et al., 2007; Wright & Simms, 2016) and capacity (Palmer et al., 2013). In the general population, the most common paradigm used to measure attentional bias paradigm is the VDP (Macloed, Mathews & Tata, 1986). This is likely to be an appropriate method of the attention capture of food cues within a secure inpatient settings as the task is non-invasive and straight forward to administer. The VDP was originally designed to measure responsivity to threat cues but has since been adapted to be used as a measure of responsiveness to food cues (Hagan et al., 2020). During a typical VDP task, participants are asked to detect the position of a target or probe. This probe can appear in one of two possible locations, replacing either a salient stimulus (i.e., a food image or word) or a neutral stimulus (Tapper, Pothos & Lawrence, 2010). The time taken to correctly detect the probe (ms) is inferred as a measure of attentional resources which were allocated to the stimulus that proceed it. Attentional bias is calculated by subtracting mean reaction times (RTs) to probes that replace food stimuli from the mean RTs to probes replacing neutral stimuli. A positive bias score suggests that greater attention was oriented towards the salient stimuli compared to the neutral stimuli.

There is a large variance in terms of the duration used to present the stimulus in VDP tasks used within appetite research. In their review, Hagan et al. (2020) highlight that VDP to measure attentional bias to food cues in normal weight populations typically use stimulus presentations from 100ms to 3000ms. However, in studies that explore attentional bias in

clinical populations (Miller & Fillmore, 2011) and populations that have morbid obesity (Brogmus & Bowling, 2014) stimulus durations of 1000ms are more typically used. The varying stimulus durations of VDP is considered a limitation, as different stimulus durations relate to different areas of attention capture and can have implications for the interpretation of results (Hagan et al., 2020). Furthermore, Schmukle (2005) and Rodebaugh et al. (2016) have brought the psychometric properties of the VDP into question and note that the paradigm has poor test-retest reliability. However, van Ens et al. (2019) and Waechter et al. (2014) note that when the length of stimulus presentation is increased, there is an improvement of psychometric properties. A key strength of the use of the VDP is that the use of pictorial stimuli improves the ecological validity of the task (Brignell et al., 2009).

As mentioned previously there are likely to be inherent difficulties with using computer-based tasks within a secure environment as firstly all electronic equipment must undergo vetting by the organisation. Furthermore, some equipment, such as eye tracking (which is a common and robust method of capturing attentional bias, see Chapter 2, section 2.4.1) can be invasive as equipment must be attached the head. The VDP however, does not rely on the use of such equipment and is therefore a more appropriate task to use in secure settings. There are still issues with use of computer equipment within secure settings, however. Due to the complex behaviour that patients experience in the context of their mental health, there may be issues surrounding patient and researcher safety when using electronic equipment and therefore the design of the VDP must take on board these limitations and be administered over a short time frame. Moreover, the sedative effects of psychiatric medication may mean that secure psychiatric patients have slower processing or response times compared to those who are not using psychiatric medication (Moncrieff, Cohen & Porter, 2013).

5.1.1 Attentional Bias: Relationship with Dysregulated Eating Behaviour and Obesity

High attentional bias for food cues have been documented in individuals with dysregulated eating behaviour (Seage & Lee, 2017). High levels of dysregulated eating behaviour are associated with the increased consumption of high calorie foods (Litwin et al., 2016; Lowe & Maycock, 1988), weight gain and obesity (Afari et al., 2019; Bressile et al., 2004; Hays & Roberts, 2008; Hays et al., 2002; Lindroos et al., 1997; Provencher et al., 2003; Wilkinson et al., 2010). For example, in their study Provencher et al. (2003) explored the association between obesity and eating behaviours in a non-clinical sample of 596 participants. They found that obese participants had significantly greater levels of disinhibited eating compared to overweight and normal weight participants. Several studies have also highlighted that disinhibited eating has high prevalence in a variety of psychiatric conditions such as mood and personality disorders (Cuntz et al., 2001; Riener, Schindler & Ludvik, 2006; Yanovski et al., 1993). This is unsurprising since many people use palatable foods as a source of comfort in response to negative emotions (Litwin et al., 2017).

As such, emotional eating (another form of dysregulated eating behaviour), is commonly associated with symptoms of mood disorders (Lazarevich et al., 2016). Emotional eating also a useful predictor of weight gain (Hays & Roberts, 2008) and has been associated with the habitual consumption of high calorie foods (Litwin et al., 2017; Lowe & Maycock, 1988; Oliver, Wardle & Gibson, 2000). For example, in Oliver, Wardle and Gibson's (2000) study, they examined participants food choices in response to acute stress. In their sample of 68 healthy participants, they found that participants that had high levels of emotional eating behaviour consumed sweet, high-fat foods compared to non-emotional eaters. These findings

would suggest that individuals who experience frequent negative and uncomfortable emotions (such as those with SMI) may regularly consume hedonic foods.

The association between obesity and other forms of dysregulated eating behaviour (e.g., cognitive restraint) is unclear. Restrained eating is the propensity to intentionally restrict food intake with the goal of preventing weight gain or encouraging weight loss through the control of energy intake and the type of food that is consumed (Hays et al., 2002). The literature suggests that restricting the amount of food consumed can be an effective weight management tool if it is implemented within a weight management program (Schaumberg et al., 2016). However, generally a lack of reliance on physiological markers to regulate food intake (which is a common feature of restrained eating) is predictive of overconsumption and binge eating patterns (Maras et al., 2016). Existing literature highlights that individuals who have high scores on measures of dietary restraint often have increases in BMI (Anderson et al., 2016, Schaumberg et al., 2016); however, there is a gap in the literature regarding levels of cognitive restraint found within SMI populations. As people with SMI have a greater prevalence of disinhibition (Ethridge et al., 2014) one would expect that they would exhibit lower levels of cognitive restraint and restraint eating.

Many people in secure psychiatric settings experience low mood because of their poor mental health (Zhong et al., 2019) and are typically reported to exhibit high levels of disinhibited behaviour (Delfin et al., 2020). For example, people with schizophrenia can experience executive function deficits because of the complex neuropsychology associated with the disorder (Chan et al., 2003; Knolle-Veentjer et al., 2008). The neuropsychological deficits associated with schizophrenia result in an impaired supervisory attentional system (Chan et al., 2003), a concept which is said to be fundamental in the effective control of

action in day-to-day life and is involved in the flow on tasks involving inhibition (Norman & Shallice, 1986; Shallice, 1988). It is plausible that the impaired ability to inhibit behaviour in these individuals can result in dysregulated eating behaviour. Again, there is limited literature documenting the extent to which these eating behaviours are displayed by individuals with SMI.

5.1.1.1 Measuring Dysregulated Eating Behaviour

A common feature of studies exploring dysregulated eating behaviour within the general population is that many use the Three Factor Eating Questionnaire (TFEQ; Stunkard & Messick, 1985) to assess levels of dysregulated eating behaviour. This 51 item self-report questionnaires measures three dimensions of eating behaviour, namely, cognitive restraint (dietary restraint), disinhibited eating and hunger (Stunkard & Messick, 1985). Karlsson et al. (2000) conducted a study to assess the psychometric properties of the TFEQ. The authors found that there were issues concerning validity and reliability of the three subscales. As a result, the number of items was reduced to 18 and the disinhibited eating and hunger subscales were merged. Furthermore, the authors also identified factors relating to emotional eating and included this as the third eating behaviour construct in the newly formed TFEQ-R18 (Karlsson et al., 2000). Angle et al. (2009) highlight in a sample of obese individuals, mean scores on the cognitive restraint, uncontrolled eating and emotional eating subscales are 42.6, 35.4 and 46.6. respectively. These scores are greater than overweight, normal weight and underweight individuals (Angle et al., 2009).

High scores on the cognitive restraint subscale (TFEQ-R18-R) are suggestive that the individual has a proclivity to control food intake to meet their specific weight related goal.

For uncontrolled eating (TFEQ-R18-U), high scores indicate tendency to lose control when eating. High scores on the emotional eating subscale (TFEQ-R18-E) indicates high levels of eating in response to negative emotions.

The sub-scales of the TFEQ-R18 have been shown to have high internal reliability in a sample of adults (Cronbachs α >0.7) (Karlsson et al., 2000) and high test-retest reliability (>0.8) over two weeks, which suggest that this measure of dysregulated is stable over time (Mostafavi et al., 2017). The short number of items in the TFEQ-R18 also makes it an easy and appropriate measure to administer to populations that are prone to fatigue, such as those with SMI (Water, Naik & Rock, 2013). As suggested in Chapter 2 (section 2.4.2) there are a few other measures that are used to document dysregulated eating behaviour, however these are beyond the scope of this project.

5.1.2 Delaying Gratification

Inhibitory deficits that are associated with dysregulated eating behaviours may also explain why some individuals have a reduced ability to delay immediate gratification (Dawd, 2017). The ability to sacrifice immediate gratification for the sake of long-term reward, is a concept known as delayed gratification (Hoerger, Quick & Week, 2011). Delayed gratification has been conceptualised as the ability to effectively mediate impulsive control and resiliency in response to environmental stressors (Hoerger, Quick & Weed, 2011). As such, deficits in delayed gratification are associated with greater BMI (Epstein et al., 2013; Weller et al., 2008). For example, Weller et al. (2008) explored if obese individuals had greater deficits in delayed gratification compared to non-obese individuals. In their sample of 112 participants, they found that individuals were obese had more difficulty delaying

gratification compared to those with lower BMIs. It has been highlighted that the ability to delay gratification is also associated with a lower BMI range in children (Bruce et al., 2011; Caleza et al., 2016). Ability to delay gratification in childhood is also a reliable predictor of BMI in adulthood (Schlam et al., 2013). This has important implications for people with SMI because they often exhibit a reduced ability to defer reward and have higher levels of disinhibition compared to the general population (Chan et al., 2004; Knolle-Veentjer et al., 2008). However, the extent to which individual differences in ability to delay gratification are predictive of weight gain in secure psychiatric services is unclear.

To date there have not been any published studies that have explored delayed gratification within a secure psychiatric inpatient population. However, existing research that explored delayed gratification in general and clinical populations have utilised experimental tasks that use items of reward such as marshmallows or money to assess delayed gratification (Dawd, 2017). The Delayed Gratification Inventory (DGI-35; Hoerger, Quirk & Weed, 2011) is a relatively new, psychometric measure which comprises five domains. These are food, money, physical pleasures, social interactions and achievement. The fact that this measure explicitly measures delayed gratification of food makes it a desirable psychometric to use within appetitive research. In non-clinical adult samples, participants score on average 22.3 on the food subscale of the DGI-35 (Hoerger, Quirk & Weed, 2011). High scores on the DGI-35 indicate a high level of ability to defer gratification. The food subscale of the DGI-35 (DGI-35-F) has been shown to have high internal reliability in a sample of adults (Cronbachs $\alpha > 0.7$) and high test-retest reliability (>0.7) over two months, which suggest that levels of delayed gratification towards food are stable over time (Hoerger, Quirk & Weed, 2011).

5.1.3 Summary

The above review highlights a number of core cognitive and appetitive factors that have been shown to be associated with obesity in the general population. It is likely that the impact that these factors have on obesity may be exacerbated in individuals with SMI. For individuals who are being within secure psychiatric environments these factors will most likely act additively (Day & Johnson, 2017). The participants for this study were again recruited from a population of psychiatric inpatients resident within medium and low secure units in South Wales. This study documented participant's eating behaviours using the TFEQ-R18 (Karlsson et al., 2000). Delayed gratification was measured using the DGI-35-F (Hoerger, Quick & Week, 2011). Participants also completes the VDP task which contains high calorie food cues. In this study, weight change was measured over a period of six months (weight was measured at baseline, three months, and six months).

The aim of the current study was to establish whether weight gain (in the first six months of admission) was associated with attentional bias to food cues, dysregulated eating behaviours and the ability to delay gratification. Specifically, it was anticipated that if an individual was hyperresponsive to food cues (measured by attentional bias to food cues on the VDP) that this would be associated with weight gain (Hendriske et al., 2015). It is also anticipated that high rates of emotional and uncontrolled eating would be associated with higher indices of attentional bias (Seage & Lee, 2017). Although there appears to have been no direct attention paid to this next issue, logic dictates that personality traits of cognitive restraint and delayed gratification will be positively associated with each other and protective with respect to weight gain.

5.2 Method

5.2.1 Sample

Participants in the current study were recruited from the inpatient populations at medium or low secure psychiatric services within South Wales. To be eligible to take part in the study individuals were required to have capacity to refuse participation or withdraw from the study. Therefore, only participants that were clinically stable and who were likely to still be an inpatient within the service over six months were included in recruitment processes. Participants were required to have the capacity to complete a short computer-based task and read basic English. To control for hunger all participants were also required to have eaten prior to participation.

Participant (n = 24) demographics are outlined in Table 5.1. The sample was primarily male patients (95.8%) from medium secure inpatient services. Twenty-four patients who were inpatients in medium (n = 21) or low secure (n = 3) psychiatric services in South Wales participated in the study. Seventy percent of patients were prescribed antipsychotic medication that are associated with high risk of weight gain. Conversely, the majority of participants were prescribed non-antipsychotic medication that was of low weight gain risk (70.8%). Participants mean BMI at baseline was in the obesity class II range (35.75kg/m^2 ± 8.3). However, BMI ranged in this sample from 23.9 to 56.4kg/m^2.

Table 5.1.
Participant demographics, clinical characteristics and baseline weight.

	N
Sex	
Male	23
Female	1
Age (years)	Mean = 38.75 (SD = 8.8)
	Range = 27 to 54
Security	
Medium	20 (83.3%)
Low	4 (16.7%)
Antipsychotic medication weight gain risk	
High risk	17 (70.8%)
Moderate risk	2 (8.3%)
Low risk	5 (20.8%)
Non-antipsychotic medication weight gain risk	
High risk	7 (29.2%)
Low risk	17 (70.8%)
BMI at baseline	Mean = 35.8kg/m^2 (SD = 8.3)
	Range = 23.9 – 56.4kg/m^2

5.2.2 Design

The current study was a prospective cohort study design. The target population were inpatients from Welsh medium and low secure services. There were several predictor and outcome variables. Mean RTs for food cue bias was a continuous variable. Scores on TFEQ-R18 subscales; cognitive restraint, uncontrolled eating and emotional eating were continuous

variables. Scores on the food subscale on the DGI-35 were continuous variables. As hunger is a predictor of attentional bias towards food in the wider literature, participant's hunger was controlled for in this study. This variable was measured continuously using a Visual Analogue Scale (VAS). The DV's in the current study were BMI difference between baseline and three months and BMI difference between baseline and six months. These variables were continuous and measured by participants weight in kilograms divided by their height in metres squared (kg/m^2).

5.2.3 Materials

Details of the development of patient facing materials used in this study (e.g., participant introduction letter, participant information leaflet and consent form) can be found in Chapter 3 (section 3.3.2).

5.2.3.1 Visual Dot Probe Task

The visual dot probe paradigm was used to measure level of attentional bias to food cues and has been used in other published research conducted in non-clinical samples (see Hagan et al., 2020 for review; Seage & Lee, 2017; Tapper et al., 2008). This is a computerised task which required participants to respond to pictorial stimuli. During each trial, participants were asked to pay attention to a fixation cross placed in the centre of a computer screen. The fixation cross was presented for 1000ms. Following this, two picture stimuli were presented on either side of the screen. The test stimuli consisted of 64 pairs of coloured pictures. Thirty-two of these pairs were either high calorie foods coupled with a household item, or a low-calorie food coupled with a household item (16 pairs per condition). The remaining 32 of these pairs were two household items. During the task picture pairs were presented for

1000ms duration across two blocks of critical and neutral trials. The total number of trials in this task was 256 which was split evenly between critical and neutral trials. Each block contained 4 random presentations of each of the experimental or matched neutral picture pairs (e.g., experimental stimulus shown on left, followed by a probe on the left; experimental stimulus on left, followed by a probe on the right; experimental stimulus shown on the right, followed by a dot probe on the right and experimental stimulus show on right followed by a probe on the left). Participant's responses to stimuli were made by using designated buttons on a Chronos V response box. For this study, a DELL Inspiron 15, 5000 15.6-inch laptop computer was used to display the task which was run on ePrime (version 3) software.

5.2.3.2 Questionnaire Pack

The study included a questionnaire pack. This questionnaire pack was inclusive of a hunger scale, the Three Factor Eating Questionnaire Revised 18 (TFEQ-R18; Karlsson et al., 2000) as a measure of dysregulated eating behaviour, and the Delaying Gratification Inventory Food Subscale (DGI-F; Hoerger, Quirck & Weed, 2011). These materials are discussed in greater detail below. Several other measures were included in this questionnaire pack and are discussed in Chapter 6.

5.2.3.3 Pre-test Hunger Scale

Patient hunger was assessed using a 100-millimetre VAS (1 to 100) mood questionnaire. Hunger was hidden in this four-item questionnaire that besides hunger including participants level of thirst, happiness, and energy. Participants were required to place a marker on this

scale, whereby a score of 1 indicated not at all hungry and a score of 100 indicated the participant was extremely hungry.

5.2.3.4 Dysregulated Eating Behaviour

The TFEQ-R18 (Karlsson et al., 2000) was used to assess dysregulated eating behaviour. The TFEQ-R18 has three subscales which measure cognitive restraint (TFEQ-R18-R), uncontrolled eating (TFEQ-R18-U) and emotional eating (TFEQ-R18-E). The questionnaire contains 18 items which uses a four-point response scale. The TFEQ-R18-R measure contains six items with a maximum overall score of 24. The TFEQ-R18-U is measured by nine items with a maximum overall score of 36 and the TFEQ-R18-E is measured by three items with an overall maximum score of 12.

5.2.3.5 Delayed Gratification

The food subscale of the DGI-35-F (Hoerger, Quirk & Weed, 2011) was used to measure ability to delay gratification from food. This subscale encompasses seven items measured on a five-point scale with an overall maximum score of 35.

5.2.4 Procedure

The recruitment process for this study has been highlighted in Chapter 3 (section 3.3.2). Sessions took place after the participant had eaten their breakfast or lunch to ensure that task performance was not affected by hunger. On arrival to the study session, participant's height (cm) and weight (kg) were recorded. Demographic (age, sex, security of placement) and pharmacological (prescribed medication) information was also collected from the participant at this point. Prior to the commencement of the study task, the participant was asked to rate

their hunger which was hidden in a short mood questionnaire and measured using a visual analogue scale (VAS). Participants were asked to rate their mood on a scale of 0 to 100. The researcher then explained the requirements of the VDP: specifically, that they will attend and respond to pictorial stimuli. During the VDP, participants were positioned in front of a computer screen. Response times (RT) were recorded in milliseconds (ms). Following completion of the VDP, participants completed the questionnaire pack which included the TFEQ-R18 and DGI.

On average, the data collection session lasted approximately 60 minutes. Participant weight was collected three months and six months following the date of their recorded baseline weight. Attentional bias scores were calculated for each participant and stimulus type by subtracting the mean RT for probes replacing congruent items (food items and neutral items, respectively) from the mean RT for probes replacing incongruent items. All incorrect responses on the VDP were removed from the data set. Outlier response times were also removed for correct trials; these were response times (ms) that were <200ms and/or >2000ms, as well as those which were two standard deviations above or below the participant mean.

5.2.5 Method of Analysis

The current study initially planned to conduct a multiple regression analysis to predict patient weight difference over three and six months. However, this was not feasible given the lack of power in the sample and correlational data. Therefore, a correlational design was implemented in the current study to assess if attentional bias towards food cues, dysregulated eating behaviour and delayed gratification were associated with BMI change over a three- and six-month period (result from a multiple regression analysis can be found in Appendix

H). Wilcoxon signed-rank tests were conducted to assess the difference in BMI from baseline to three- and six-months post baseline. This was also conducted to assess difference in BMI between three and six months. A Spearman's rank-order correlation matrix was established to assess associations between self-reported pre-test hunger, attentional bias, dysfunctional eating and delayed gratification of food and BMI differences of three and six months.

5.3 Results

Descriptive data for this study is highlighted in Table 5.2. This indicates that although all participants were required to have eaten in the hour prior to their participation, ratings of self-reported hunger indicate that the sample was moderately hungry and the variance in reported hunger was large. The internal consistency of the three constructs of the TFEQ-R18 and food construct of the DGI were assessed using Cronbach's alpha. The uncontrolled eating and emotional eating constructs of the TFEQ-R18 had a high level of internal consistency (Cronbach's α = >0.9). However, the cognitive restraint construct of the TFEQ-R18 and food construct of the DGI had only an acceptable level of internal consistency (Cronbach's α = >0.6).

Table 5.2.
Descriptive data of study 2 variables.

	Mean	SD	A
Pre-test hunger score	32.9	26.0	
Cognitive restraint	14.0	3.6	>0.6
Uncontrolled eating	21.7	7.2	>0.9
Emotional eating	6.8	3.2	>0.9
Delayed gratification of food	22.8	5.7	

5.3.1 Weight Change.

As shown in Figure 5.1, mean BMI at three months increased from baseline but the sample stayed within the obesity class II range. Mean BMI at baseline was 35.8kg/m^2 (SD = 8.3), compared to 36.1kg/m^2 (SD = 8.6) at three months and 36.0kg/m^2 (SD = 9.6) at six months. Body mass index range for this time point was 24 to 58.4kg/m^2. A Wilcoxon signed-rank test was conducted to determine the difference between BMI at baseline and BMI three months post baseline. Twenty-four participants were included in this analysis. The difference scores were approximately symmetrically distributed, as assessed by a histogram with superimposed normal curve. Of the 24 participants in this analysis, 15 experienced an increase in BMI over three months, whereas eight did not see any increases in BMI. There was no statistically significant increase in BMI (*Mdn* = 0.25 kg/m^2) between baseline (*Mdn* = 32.95 kg/m^2) and three months post baseline (*Mdn* = 34.05 kg/m^2), $z = 1.17$, $p = .241$.

At six months, the mean BMI was greater than baseline, but lower than weight recorded at three months. Classification of mean BMI at six months remained in the obesity class II range and ranged between 23.3 to 62.2kg/m^2. Between the three- and six-months study period's two participants were discharged and therefore their weight was not collected at six months. A Wilcoxon signed rank test was conducted to determine the difference between BMI at baseline and BMI six months post baseline. Twenty-two participants were included in this analysis. The difference scores were approximately symmetrically distributed, as assessed by a histogram with superimposed normal curve. Data are medians unless otherwise stated. Of the 22 participants in this analysis, 13 experienced an increase in BMI over six months, whereas nine did not see any increases in BMI. There was no statistically significant increase in BMI (*Mdn* = 0.65 kg/m^2) between baseline (*Mdn* = 32.25 kg/m^2) and six months post baseline (*Mdn* = 32.70 kg/m^2), $z = 1.364$, $p = .172$.

A Wilcoxon signed rank test was also conducted to determine the difference between BMI at three months post baseline and BMI six months post baseline. Twenty-two participants were included in this analysis. The difference scores were not approximately symmetrically distributed, as assessed by a histogram with superimposed normal curve, however the analysis was conducted anyway. Data are medians unless otherwise stated. Of the 22 participants in this analysis, 14 experienced an increase in BMI over this period, whereas eight did not see any increases in BMI. There was no statistically significant increase in BMI (*Mdn* = -0.20 kg/m^2) between three (*Mdn* = 32.95 kg/m^2) and six months post baseline (*Mdn* = 32.70 kg/m^2), z = -.699, p= .485.

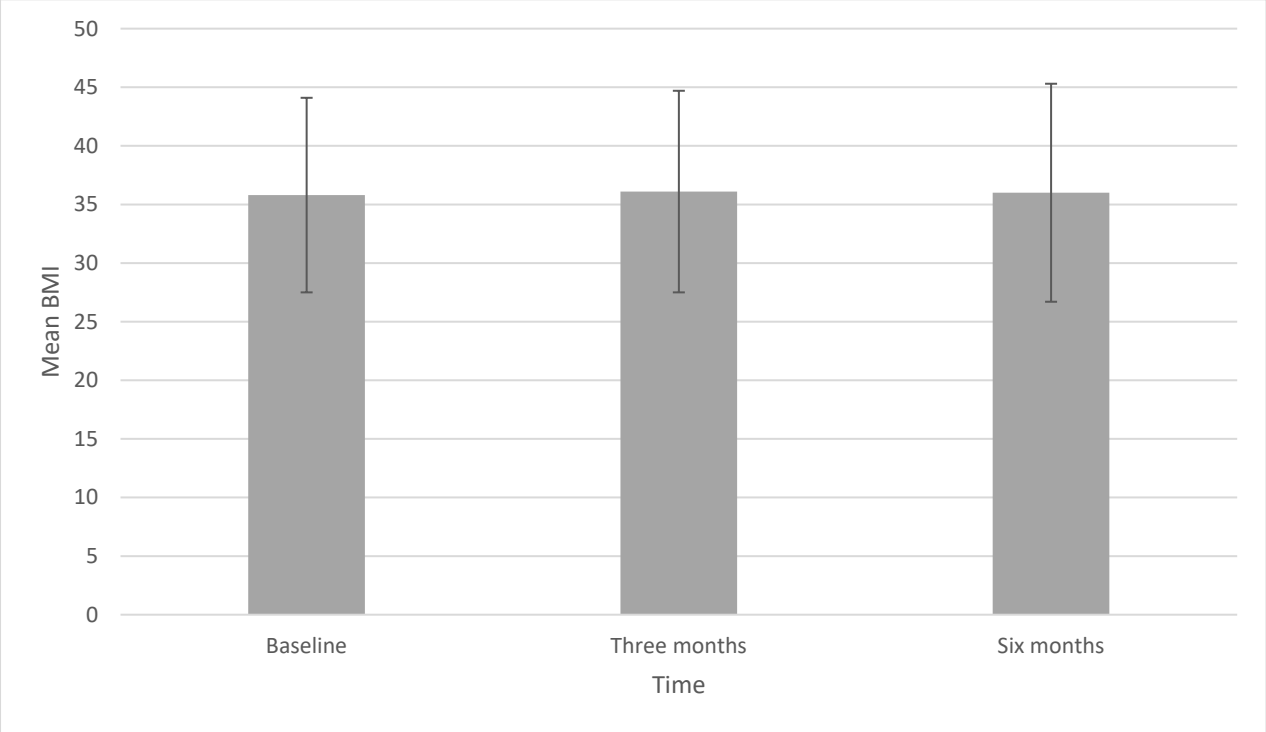

Figure 5.1. Mean BMI (± SD) at each study time point.

5.3.2 The Attentional Capture of Food Cues

Participants correctly identified 95.7% of probes in this task. A paired samples t-test was run to explore the difference in accuracy towards food cues and neutral cues on the VDP. There was no significant difference in accuracy between food and neutral cues (mean 98.4% compared to 96.8%) [t (23) = 1.696 p = .103]. All participants had a quicker response to food cues on the VDP task compared to neutral cues which is reflected in the mean attentional bias to food cues scores (21.0ms, SD = 79.4). As shown in Figure 5.2, participants had quicker mean reaction times to food stimuli (mean = 453.7, SD = 132.6) compared to neutral stimuli (mean = 432.7, SD = 123.4), however this difference was not statistically significant.

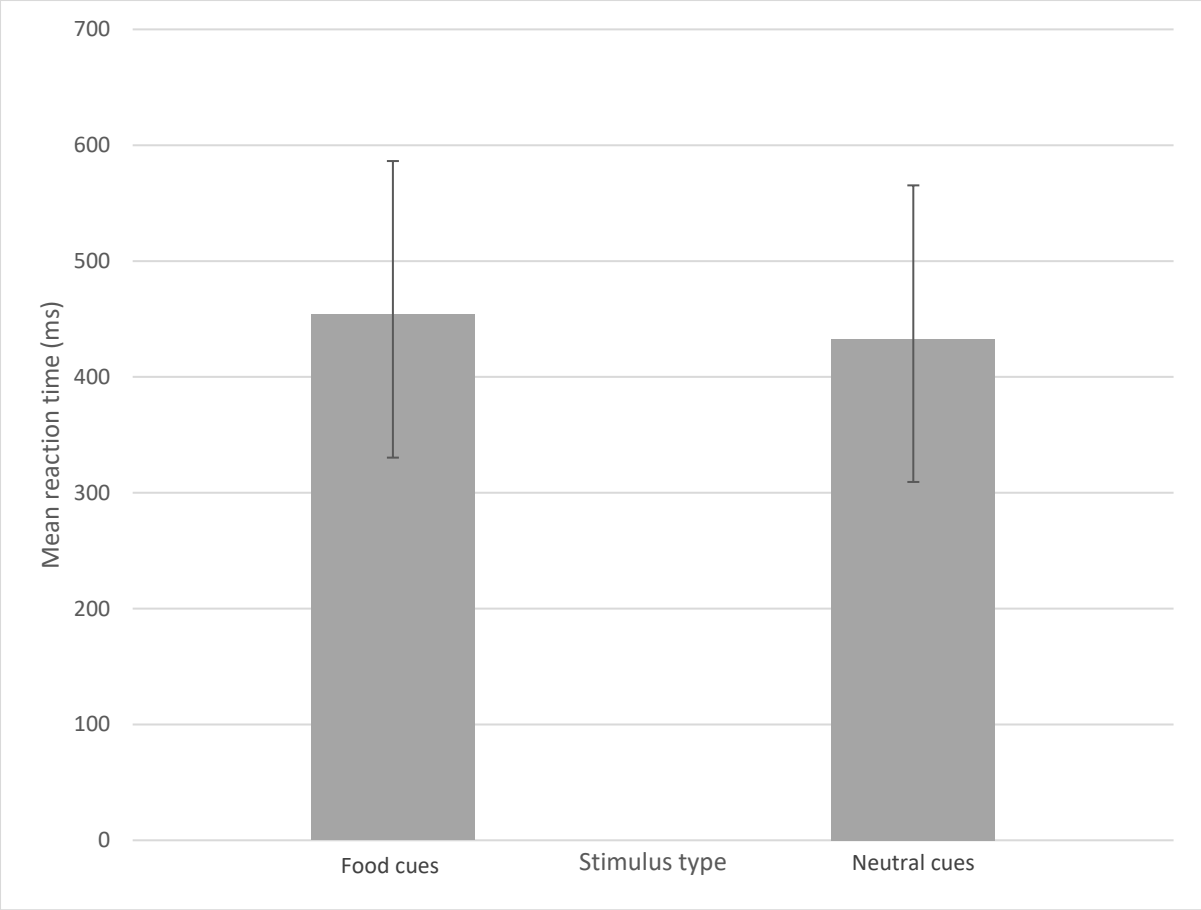

Figure 5.2 Bar graph with error bars showing mean reaction times for food- and neutral cues.

5.3.3 Associations between Attentional Bias, Dysfunctional Eating Behaviour, Delayed Gratification, and BMI Difference Over Three and Six Months

Spearman's rank-order correlations were run to assess the relationships between self-reported pre-test hunger, food cue bias, cognitive restraint, uncontrolled eating, emotional eating, delayed gratification of food, baseline BMI, and BMI difference over three and six months. These are highlighted in the correlation matrix, below (Table 5.3). Preliminary analyses showed that the relationships were monotonic, as assessed by visual inspection of scatterplots. There was a statistically significant, medium positive correlation between baseline BMI and uncontrolled eating, $r_s(22) = .485$, $p < .016$, and emotional eating, $r_s(22) = .510$, $p < .011$. There was also a statistically significant, medium positive correlation between pre-test hunger score and BMI difference over three months, $r_s(22) = .607$, $p < .002$. Furthermore, there was a statistically significant, medium positive relationship between uncontrolled eating and BMI difference over three months, $r_s(22) = .482$, $p < .017$, and emotional eating and BMI difference over three months, $r_s(22) = .426$, $p < .017$.

Table 5.3.
Correlation matrix for study 2.

	Food cue bias	TFEQ-R18-R	TFEQ-R18-U	TFEQ-R18-E	DGI-F	Baseline BMI	BMI difference 3 months (n=24)	BMI difference 6 months (n=22)
Pre-test hunger	r_s = .193 P = .366	r_s = .192 P = .368	r_s = .591 P = .002	r_s = .263 P = .214	r_s = -.149 P = .486	r_s = .303 P = .150	r_s = .607 P = .002*	r_s = .353 P = .107
Food cue bias		r_s = -.260 P = .221	r_s = .005 P = .98	r_s = .009 P = .967	r_s = .034 P = .876	r_s = .192 P = .369	r_s = .113 P = .598	r_s = .142 P = .527
TFEQ-R18-R			r_s = .520 P = .008	r_s = .482 P = .017	r_s = -.152 P = .478	r_s = .053 P = .805	r_s = .095 P = .659	r_s = .140 P = .534
TFEQ-R18-U				r_s = .851 P = .000	r_s = -.242 P = .255	r_s = .485 P = .016*	r_s = .482 P = .017*	r_s = .374 P = .087
TFEQ-R18-E					r_s = -.279 P = .186	r_s = .510 P = .011*	r_s = .426 P = .017*	r_s = .386 P = .076
DGI-F						r_s = -.161 P = .451	r_s = -.139 P = .519	r_s = .049 P = .829
Baseline BMI							r_s = .176 P = .411	r_s = .073 P = .745
BMI difference 3 months								r_s = .877 P = .000*

Note. * = p <.05

5.4 Discussion

The aim of the current study was to establish if common appetite variables associated with a heighted risk of weight gain in the general population were predictive of weight gain in secure settings. The study collected measures of patient's attentional bias towards food cues, dysregulated eating behaviour pattens and self-reported ability to delayed gratification from food. Weight changes were recorded over a three and six months.

Findings from this study suggest that, compared to non-clinical obese samples, participants had much lower scores on cognitive restraint, uncontrolled eating, and emotional eating subscales of the TFEQ-R18 (Karlsson et al., 2000). Scores on the TFEQ-R18 subscales in this sample were also lower than what is typically documented in that for underweight, normal weight and overweight populations. Mean scores on the TFEQ -R18 were 14.0, 21.7 and 6.8, respectively. One possible explanation for this is that due to sensitivities about their weight, participants may have under reported their levels of dysregulated eating behaviours as captured by the TFEQ-R18. Furthermore, the TFEQ-R18 was not created specifically for use with secure inpatient populations, a group of individuals with high levels of low literacy (Habibisaravi et al., 2015). It may be that whilst patients in this study could read and write in English (as was one of the requirements for participation in this study), they may still have had difficulties in fully understanding questions in the TFEQ-R18. Patients may also lack the ability to reflect objectively on their levels of dysregulated eating behaviour because of insight difficulties typically seen in individuals with SMI (Yanos et al., 2016). As a result, the TFEQ-R18 may not be the most appropriate measurement of dysregulated eating for use within clinical populations.

The current study also found that the patient had similar scores and variance on a measure of delayed gratification of food to that documented in the general population. Mean scores in this sample were 22.8 (SD = 5.8). In non-clinical samples of adults, mean scores on the DGI-35-F range between 19.5 and 22.3 (Giovanelli et al., 2013; Hoerger, Quirk and Weed, 2011), suggesting that scores in the current sample were slightly greater than non-clinical samples. There is a significant gap in the literature regarding the level of gratification delay seen in obese or psychiatric inpatient samples, however based on the prevalence of lack of inhibitory control in this population (Ethridge et al., 2014) these findings are not totally unexpected. Future research should look to explore the reliability of the DGI-35 in clinical samples so that meaningful comparisons can be drawn between clinical samples.

In this study the VDP was used to capture participants response to food cues. Task performance in the current sample was comparable to the general population, however there was a large variability in bias indices. Individual mean scores of participants indicate that all responded quicker to probes replacing food cues compared to neutral cues on the VDP task, although this difference was not statistically significant. This suggests that much like the general population, those with SMI have attentional bias towards food cues. The fact that patients with SMI in this study had an attentional bias towards food cues is expected given that the mean BMI in this study was within the obesity class II range (36.1 m/kg^2) and those who are obese are more likely to have an attentional bias towards food cues (Hendriske et al., 2015).

Mean bias index for food cues was 21.0ms, which is greater than what is typically documented in other populations of obese participants, where scores range between 0.5ms to 12.2ms (Kemps, Tiggemann & Hollitt, 2014; Loeber et al., 2012; Nijs et al., 2010a; Nijs et

al., 2010b). However, the mean attentional bias score in the current study is similar to that found in a sample of overweight and obese participants who were hungry prior to taking part in the VDP (Stamataki et al., 2019). Stamataki et al. (2019) found in their study that fasted overweight and obese participants had an attentional bias score of 22.4ms. It may be that the participants in the current study experienced greater levels of hunger compared to those in Loeber et al. (2012), Kemps, Tiggemann and Hollitt (2014) and Nijs et al's. (2010a) studies. This may be supported by literature that highlights the use of antipsychotic medication is associated with greater levels of hormones that promote hunger (Esen-Danaci et al., 2008). Overeating may also be high in this study sample because participants are exposed to a plethora of high calorie foods (Day & Johnson, 2017). It has been suggested that increased attention to food stimuli in the environment heightens the desire to consume them (Kemps, Tiggemann & Hollitt, 2014).

Within this study, participants BMI increased at three and six months compared to baseline, however this difference was not statistically significant. This increase in BMI was equated to a mean weight increase of 1.24kg over three months and 1.22kg over six months. This is less than the 3.8kg of weight gained by patients over the first three months of admission, as documented in work package 1 (Chapter 4) and in several studies (Every-Palmer et al., 2018; Hilton et al., 2015; Wetterling, 2006). This is likely because weight gain does appear to tailor off after the initial stages of inpatient treatment (Gentile, 2006; Lamberti, Bellnier & Schwarzkopf, 1992; Zimmerman et al., 2003). For example, as suggested in Chapter 1 (section 1.2), weight gain is mostly seen between admission and six to 12-weeks post admission (Wetterling, 2006). Many of the service users in the current study had been an inpatient for some time prior to taking part and therefore may be experiencing a plateau in their weight gain (Gentile, 2006; Lamberti, Bellnier & Schwarzkopf, 1992;

Zimmerman et al., 2003). Moreover, the average BMI for participants in this study was within the obesity class II range and it is thought that the speed at body weight increases becomes slower the higher that BMI is (Thomas et al., 2014).

Another possible explanation for this trend in weight gain is due to the research being funded by a KESS project whereby the researcher worked within the service for over a year prior to the study commencement. Whilst this work was not in relation to patient's weight management, staff members were aware that research was being conducted into patient weight gain. When behaviour is observed by outside parties it can influence behaviour change, particularly in the context of eating behaviour (Higgs, 2015; van Rongen et al., 2020). In this case, the presence of a health researcher at ward level may have raised awareness of the obesity and weight gain issue within the service, which in turn may have prompted staff to be more consciousness about health-related behaviours.

Another key finding in the current study was that there were moderate-positive relationships between uncontrolled eating, emotional eating, and BMI difference over three months. Whilst it was not possible to predict the variance in weight change using these variables, it suggests that higher levels of uncontrolled eating and emotional eating may have an impact on patient's weight. As previously stated individuals with SMI have greater levels of disinhibition and engage in emotional eating (Cuntz et al., 2001; Lazarevich et al., 2016; Litwin et al., 2017; Riener, Schindler & Ludvik, 2006; Yanovski et al., 1993). This coupled with the fact that patients have a greater attentional bias towards food and have an increased accessibility of palatable foods (Day & Johnson, 2017), may account for this increase in weight gain. However, none of these variables, or any other within this study, were associated with weight difference over six months. It may be that there are other factors at

play, that were not measured in the current study, that may explain weight gain over a six-month period. For example, people with SMI and who are treated within secure psychiatric services experience a number of complex interpersonal and psychological mechanisms as a result of their psychopathology.

5.4.1 Limitations and Future Research

There are several limitations to consider when interpreting the results of this study. Firstly, the sample size of participants included in the data set is small; A total of 23 participants were recruited from the secure services, out of a potential 89 patients who were eligible to participate. The small sample size contributed to the failure of several pre-statistical analysis assumptions tests and resulted in the inclusion of several non-parametric tests. Small sample sizes can undermine the internal and external validity of study findings (Faber & Fonseca, 2014), and may impact on the results generalisability.

The primary reason why the current study had such a small sample size is due to the nature of the target population. Many patients within secure psychiatric services are unmotivated to engage in work that directly benefits them (Dixon, Holoshitz & Nossel, 2016); therefore, their motivation to take part in research that does not directly benefit them is even lower. This may have impacted further by the study design; participants were required to complete two different tasks (i.e., a computer-based task and questionnaire battery) which may be perceived as fatiguing. This issue was foreseen by the researcher and attempts to counteract low recruitment included using short-form versions of study materials where available (see Chapter 3, section 3.1). Furthermore, the design required participants to only

complete study materials at baseline and not at three and six months. Future research should explore ways of improving patient engagement in research in secure settings.

Participants may also have been reluctant to take part in the study because it is based upon the topic of weight gain and obesity. People with low self-esteem and mental health issues may be reluctant to participate in research on his topic area and find weight gain a delicate subject (Mizock, 2012). To negate and reduce anxiety around this issue, in the recruitment phase of this study potential participants were informed that a familiar member of staff would take measurements of their weight. Furthermore, weight and height were chosen as ways of measuring BMI, instead of collecting weight circumference, as this was felt to be a less invasive form of BMI calculation. Some patients also refused to take part as they felt that the study period (three to six months) was too long and that they were expecting to be released before the second and third weight measurements would be taken (even though this was controlled for in the recruitment process; for example, when responsible clinicians were approached to identify appropriate potential participants one of the inclusion criteria was that they must be likely to still be an inpatient within the service within the following six months). Despite this, one participant did indeed get discharged from the service between three- and six-months post baseline.

A further limitation of the current study sample is that a large majority of participants were males. Much of the literature pertaining to attentional bias and dysregulated eating behaviours are based on female only samples (Hagan et al., 2020). The bias towards a male sample reflects the fact that there is a significantly greater population of males within Welsh secure psychiatric services than females (Davies, Mills & Clarke, 2022). In any case, further

research should look to include a greater number of female participants so that meaningful conclusions can be drawn from this population of secure inpatients.

5.5 Summary

The current study has highlighted that secure psychiatric inpatients have an attentional bias towards food cues and have high levels of dysregulated eating behaviour. High levels of dysregulated eating behaviours in this study were associated with a significant increase in BMI over three months. None of the study variables were associated with weight gain over six months, however. This lack of association would appear to suggest that there are other underlying factors that may be contributing to patient weight gain in secure psychiatric services. There are psychological mechanisms that are associated with weight gain. However, this study did not explore broader psychological factors that are associated with weight gain. This is the focus of the research conducted in Chapter 5.

5.6 Key findings

- BMI increased from baseline to three months and six months, but these differences were not statistically significant.
- Patients had attentional bias towards food stimuli compared to neutral stimuli.
- Uncontrolled and emotional eating were moderately, significantly, and positively correlated with BMI difference over three months.
- No other factors were associated with weight difference over three or six months.

Chapter 6: Exploring Associations between Psychological Factors and Obesity in Secure Psychiatric Inpatients.

6.1 Introduction

The literature review in Chapter 2 highlights that obesity risk is multifaceted and that a number of psychological factors (not measured in Chapters 4 and 5) may explain why secure inpatients are particularly vulnerable to weight gain. This current chapter aims to explore the extent to which three key psychological mechanisms that are prevalent amongst individuals with SMI (namely attachment style, ACEs, and experiential avoidance) can contribute to understanding why secure psychiatric inpatients are at risk of weight gain.

6.1.1 Attachment

Insecure attachment is characterised by dysfunctional self-representation, poor emotion regulation and ability to maintain healthy interpersonal relationships (Mikulincer & Shaver, 2012). Insecure attachment styles are thought to develop in early childhood and are influenced by the child's relationship with their primary care giver (Carr & McNulty, 2016). Anxious-preoccupied attachment is associated with sporadic contact with a primary caregiver in early life, whilst dismissive-avoidant attachment is associated with a rejecting caregiver (Carr & McNulty, 2016). Fearful-avoidant attachment is thought to occur in response to abuse and neglect in early childhood (Carr & McNulty, 2016). In adulthood, insecure attachment styles are predictive of difficulties in expression of emotions (Lee & Hankin, 2009; Moutsiana et al., 2014; Pascuzzo, Moss & Cyr, 2015), maintaining close relationships (Allen et al., 2007; Givertz et al., 2013; McNelis & Segrin, 2019), and engaging in effective and positive decision making (Engin, 2011). Such behaviours and insecure attachment styles

are commonly documented in patients with SMI who are accessing secure psychiatric services (Aghevli, Blanchard & Horan, 2003; Henry et al., 2007; Kring & Elis, 2013; Timmermann & Emmelkamp, 2006; Mikulincer & Shaver, 2012). Timmerman and Emmelkamp (2006) documented attachment styles in a Dutch secure unit and found that 39.5% of individuals within the setting had a fearful-avoidant attachment style. This proportion is almost double what is documented in prison populations (27.6%) and general population (14.7%).

There is emerging evidence that insecure attachment styles may be a psychological precursor to weight gain (Anderson et al., 2012; Anderson & Whitaker, 2011; Maras et al., 2016 D'Argenio et al., 2009; Nancarrow et al., 2018). D'Argenio et al. (2009) compared the attachment styles of individuals with BMI within the normal range with patients on a waiting list for bariatric surgery. Here, anxious attachment styles (comprising anxious-preoccupied and fearful-avoidant attachment) made substantial contributions to statistical models of obesity (R^2 = 0.27, OR = 1.23), with the anxious attachment predicting 18% of the variance of body weight even after controlling for a psychiatric diagnosis (R^2 = 0.18). However, it is worth noting that in this model early experiences of trauma (i.e., abuse) made the most substantial contribution to the variance in bodyweight and was a significant and independent predictor of obesity (R^2 = 0.20). One explanation for this finding is that the stress experienced by those who experience trauma may result in an increased appetite and the unregulated consumption of high calorie foods (see Palmisano, Innamorati & Vanderlinden, 2016 for review)

The rewarding properties associated with consumption of high calorie food can offset the negative thoughts and emotions associated with trauma, acting as a form of operant

conditioning (Antoniou, Bongers & Jansen, 2017). In support of this prediction, dysregulated eating patterns such as uncontrolled eating, emotional eating, and poor dietary restraint are common in populations that have insecure attachment style (Ty & Francis, 2013; Wilkinson, Rowe & Heath, 2013; Wilkinson et al., 2010; Wilkinson et al., 2017). Maras et al. (2016) assessed if dysregulated eating behaviour mediated the relationship between attachment style and obesity; although insecure attachment was associated with higher BMI, higher levels of emotional eating were predictive of insecure attachment. This finding suggests in populations where the prevalence for an insecure attachment style is high (such as secure psychiatric inpatients), that there will be greater incidences of emotional eating, which in turn leads to increased levels of obesity.

6.1.2 Measuring attachment style

Although there are several ways to measure attachment styles, a robust and commonly used measure within clinical settings is the Adult Attachment Interview (AAI) (George, Kaplan & Main, 1996). This measure can be difficult to administer with psychiatric populations, as it requires face-to-face interviews with participants, which typically last around one hour. This approach is resource intensive as interviews need to be transcribed and interviewers must be trained to competently use the measure.

The Relationship Questionnaire (RQ; Bartholomew & Horowitz, 1991) provides an alternative approach to capturing patient attachment styles. The RQ (Bartholomew & Horowitz, 1991) is based on the Bowlby model of attachment (1988); which states that there is an internal psychological model of the self and an internal psychological model of others, with both internal models working on a positive and negative dyad (see Table 6.1, below). As shown in Table 6.1, combinations of positive and negative internal models of the self and

others relates to four different attachment styles: secure, dismissive-avoidant, anxious-preoccupied and fearful-avoidant attachment. The RQ comprises four statements relating to each of these attachment styles. The RQ scales have been shown to have good levels of internal consistency (Cronbachs a = >0.85; Bartholomew & Horowitz, 1991). Test-retest reliability of the four attachment styles has been shown to be high over an eight-month period (>0.7; Scharfe & Bartholomew, 1994), suggesting that the measures on the RQ are stable. A strength of this method is that it is easy to administer and has demonstrated independence from self-deceptive bias (D'Argenio et al., 2009). Mean self-report scores for each attachment style in samples of adult males are 4.6 for secure, 3.7 for dismissive-avoidant, 2.8 for anxious-preoccupied and 2.8 for fearful-avoidant (Scharfe & Bartholomew, 1994).

Table 6.1
Attachment styles. Adapted from Bartholomew and Horowitz (1998).

		Model of Self (Anxious)	
		Positive (Low)	*Negative (High)*
Model of Other (Avoidant)	*Positive (Low)*	**Secure (B)** Comfortable with intimacy and autonomy	**Preoccupied (C)** Preoccupied with relationships
	Negative (High)	**Dismissing (A)** Dismissing of intimacy and counter-dependent	**Fearful (D)** Fearful of intimacy and socially avoidant

6.1.3 Adverse Childhood Experiences

Early traumatic experiences are a significant contributor to insecure attachment (Gander et al., 2020; Kascakova et al., 2020; Owen, 2020; Peng et al., 2021; Prather & Golden, 2009). Such events are commonly referred to as ACEs; and include trauma that arises from

childhood harm (verbal, physical and sexual abuse, and physical and emotional neglect) and dysfunctional family environments (parental loss, witnessing domestic abuse, parental mental illness, parental substance use and parental incarceration) (Bellis et al., 2016).

It has been documented that adults in secure settings disclose a high prevalence of childhood trauma (Booth & Stinson, 2015; Stinson, Quinn & Levensons, 2016). Booth and Stinson (2015) found that secure psychiatric inpatients were likely to have experienced three or more ACEs (33.65%) with patients being exposed to frequent childhood emotional, physical, and sexual abuse (18.9%, 29.2% and 27.9%, respectively) (Booth and Stinson, 2015). The trauma associated with ACEs can significantly impact on mental health (Barbour et al., 2020; Jennes et al., 2020; Navalta, McGee & Underwood, 2018; Sturm, Haase & Levenson, 2016; Teicher & Samson, 2016). This is likely the result of the negative effects trauma can have on developing brains, particularly the amygdala (Navalta, McGee & Underwood, 2018). The association between trauma and mental illness may be explained by the high incidents of ACEs documented within secure populations. Adverse Childhood Experiences are also associated with insecure attachment styles which themselves are also are associated with an increased risk of SMI (Wilke et al., 2020).

Individuals' who experience ACEs often report engaging in unhealthy lifestyle behaviours. Bellis et al. (2016) found that individuals with four or more ACEs had a 2.2-fold increased risk of a consuming a poor diet. Furthermore, Williams et al. (2002) found that in the general population (n = 13,177), adults who had experienced physical abuse in childhood on average weighed four kilograms more than those who had not experience childhood trauma. Williamson et al. (2002) found that in this sample physical abuse was associated with a 1.4-fold relative risk of having a BMI $\geq$ 30; whilst verbal abuse had a 1.9-fold increased

risk of having a BMI ≥ 40. Overall, the authors found that 8% of cases of BMI ≥ 30 and 17% of cases of BMI ≥ 40, were attributed to childhood abuse.

The mechanism by which ACEs influence eating behaviours are likely to be complex; however, Ross (2009) proposed that overeating may be intentional and used to gain weight as having a higher body weight may allow the individual to become less desirable to sexual abusers or provide a means to protect themselves. Another possible explanation is that dysregulated eating patterns in those who experience trauma relates to the concept of psychological flexibility. This is the ability to manage environmental changes and approach problems in novel ways (Cherry et al., 2021). Individuals who are psychologically inflexible are more likely to engage in behaviours under aversive control, otherwise known as experiential avoidance (see Chapter 2, section 2.6.3). It has been suggested that individuals who experience trauma engage in experiential avoidance to distract from uncomfortable thoughts and feelings (Barenz, 2018; Bishop, Ameral & Reed, 2018; Ghazanfari, Rezaei & Rezaei, 2018; Lee & Bong, 2018; Lewis & Naugle, 2017; Roche et al., 2019; Russell et al., 2020). This is also the case for people with SMI (Castilho et al., 2017; Espejo, Gorlick & Castriotta, 2017; Spinhoven et al., 2014; Wheaton, Pinto & Wheaton 2017).

Experiential avoidance is maintained through negative reinforcement, as the relief of discomfort arising from avoidance increases the likelihood that the behaviour will continue (Schaumberg et al., 2016). Experiential avoidance may take the form of binge eating or a sedentary lifestyle, which are behaviours that can contribute to weight gain (Afari et al., 2019; Lillis, Hayes & Levin, 2011; Lillis, Levin & Hayes, 2011; Lillis et al., 2009; Lindroos et al., 1997; Schaumberg et al., 2016; Tapper et al., 2009; Wilkinson et al., 2010; Westenhoefer et al., 1994). Experiential avoidance may lead to problematic adult eating

patterns, such as the overconsumption of high calorie foods, difficulty in maintaining dietary restrictions (Afari et al., 2019; Lindroos et al., 1997; Schaumberg et al., 2016; Wilkinson et al., 2010; Westenhoefer et al., 1994) and emotional eating (Litwin et al., 2017).

6.1.4 Measuring ACE and Experiential Avoidance

A large literature base pertaining to ACEs has been established since the first ACE study conducted by Felitti et al. (1998). Felitti et al. (1998) established a ten-item measure of ACE, known as the Adverse Childhood Experiences Questionnaire (ACE-Q). Items on the ACE-Q relate to child harm such as physical abuse, verbal abuse, sexual abuse, physical neglect, and emotional neglect and familial dysfunction such as loss of a family member, household domestic abuse, substance use, mental illness and parental incarceration. The interviewee is asked whether any of these were experienced prior to the age of 18. The ACE-Q has been the primary measurement of ACEs in these studies for the past 20 years (Zarse et al., 2019). Reuben et al. (2016) have highlighted that the validity of retrospective reports, particularly when they involve recalling difficult memories, have been criticised for possible misclassification. However, Murphy et al. (2014) has highlighted that the ACE-Q has high internal consistency in samples of adults (Cronbach's a = 0.88). Dube et al. (2003; as cited in Murphy et al., 2014) demonstrate that the ACE-Q has excellent test-retest reliability.

In terms of experiential avoidance, the most common measures are the Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011) and the Multidimensional Experiential Avoidance Questionnaire (MEAQ; Gámez et al., 2011). Issues have been raised with the AAQ-II with regards to discriminating between similar traits such as neuroticism (Lewis & Naugle, 2016). The MEAQ was established to improve issues relating to discriminant

validity and improve the psychometric properties of experiential avoidance measures (Lewis & Naugle, 2016). The MEAQ is comprised of 62 items measuring six dimensions of experiential avoidance including behaviour avoidance, distress aversion, procrastination, distraction and suppression, repression and denial and distress endurance. It has been proposed that there are limitations in the practicality of administering the MEAQ in clinical and research settings (Gámez et al., 2014). As a result, the Brief Experiential Avoidance Questionnaire (BEAQ; Gámez et al., 2014) was developed to use in clinical populations. Gámez et al. (2014) established a 15-item measure relating to the six dimensions in the MEAQ. Items on the BEAQ were established based on their performance in samples of undergraduates, psychiatric outpatients, and community adults. Much like the MEAQ, the BEAQ was distinguishable from similar constructs such as negative affect and neuroticism making it a more desirable tool than the AAQ-II. The BEAQ has been shown to have high internal consistency in adult populations (Cronbach's alpha = >0.8; Gámez et al., 2014). It has also been shown to have high test-retest reliability over a period of four to six weeks (0.7; Vázquez-Morejón et al., 2019) indicating that it is stable. Mean scores in psychiatric patient samples on the BEAQ are 56.4, compared to 48.2 for student samples and 43 for community adults (Gámez et al., 2011).

6.1.5 Summary

The above review highlights how several principal psychological factors (i.e., attachment style, ACEs and experiential avoidance) that have been associated with obesity in general and psychiatric populations may create risk for patients within secure environments. It is likely that these may exacerbate obesity risk in patients within secure psychiatric environments because they will most likely work additively. As in Chapter 5 the participants for this study are a population of psychiatric inpatients resident in medium and low secure units in South

Wales. This study aimed to document participant's attachment style using the RQ (Bartholomew & Horowitz, 1991) and record the frequency of ACEs (using the ACE-Q; Felitti et al., 1998). While experiential avoidance in this study was measured using the BEAQ (Gámez et al., 2014).

As was the case in Chapter 5, patient weight change was measured over a period of six months, with weight measurements being taken at baseline, three months, and six months post-baseline. The aim of the current study was to establish whether weight gain in the first six months of admission, was associated with attachment style, ACE score and experiential avoidance. Specifically, insecure attachment styles, are expected to be positively associated with weight gain as it is in other populations (Anderson et al., 2012; Anderson & Whitaker, 2011; D'Argenio et al., 2009; Maras et al., 2016; Nancarrow et al., 2018). It is anticipated that secure attachment will be protective with respect to weight gain. It is also expected that number of ACEs (Bellis et al., 2016; Williams et al., 2002) and level of experiential avoidance (Afari et al., 2019; Lillis, Hayes & Levin, 2011; Lillis, Levin & Hayes, 2011; Lillis et al., 2009; Lindroos et al., 1997; Schaumberg et al., 2016; Tapper et al., 2009; Wilkinson et al., 2010; Westenhoefer et al., 1994) will be positively associated with weight gain as shown in the general population.

6.2 Method

6.2.1 Participants

The data pertaining to the current study was collected at the same time as the study in Chapter 5. It was felt that due to the small sample size in this work package (n = 23) and the number of independent variables, that an analysis would have greater power if they were

measured separately. As such, the study sample characteristics in this study are the same as those highlighted in Chapter 5, section 5.2.1.

6.2.2 Design

As was the case with the study highlighted in Chapter 5, the current study aimed to conduct a multiple regression analysis to predict patient weight difference over three and six months. However, this was not feasible given the lack of power in the sample and correlational data. Therefore, a correlational design was implemented in the current study to assess if attachment style, ACEs and experiential avoidance were associated with BMI change over a three- and six-month period. There were several independent variables used in the current study. Attachment style comprised four continuous variables pertaining to each attachment style as assessed by the Relationship Questionnaire (RQ; Bartholomew & Horowitz, 1991). An overall, continuous score of anxious-attachment was established by averaging mean scores for anxious-preoccupied and fearful-avoidant attachment and for avoidant-attachment by averaging mean scores for dismissive-avoidant and fearful-avoidant attachment. This was also done for insecure attachment by averaging mean scores across the three insecure attachment styles captured by the RQ. A categorical variable of attachment was also established which contained 1) those with higher scores of secure attachment and 2) higher mean scores of insecure attachment. Adverse Childhood Experiences was a continuous variable and measured using the Adverse Childhood Experiences Questionnaire (ACE-Q; Felitti et al., 1998). A categorical variable of ACEs with two levels was also established which comprised those who had 1) one to three and 2) four or more ACEs. Experiential avoidance was also a continuous variable and was measured using the Brief Experiential Avoidance Questionnaire (BEAQ; Gámez et al., 2014). The dependent variables in the current study were BMI difference between baseline and three months post baseline as

well as BMI difference between baseline and six months post baseline. These variables were both continuous and measured by participants weight in kilograms divided by their height in metres squared (kg/m^2).

6.2.3 Materials

The current study followed the same recruitment and consent taking process as that in Chapter 5. As such, the current study utilised the same participant introduction letter, participant information leaflets and consent form (see Chapter 3, section 2.3.2). As highlighted in Chapter 5 (section 5.2.3.2) the current study included a questionnaire pack. For this study, the questionnaire pack was inclusive of the RQ (Bartholomew & Horowitz, 1991), ACE-Q (Felitti et al., 1998) and BEAQ (Gámez et al., 2014). These materials are discussed in further detail below. All data collected from the current study was analysed using SPSS (version 24).

6.2.3.1 Attachment style.

The RQ (Bartholomew & Horowitz) was used to assess attachment style. The RQ includes four statements relating to each attachment style, namely secure, dismissive-avoidant, anxious-preoccupied, and fearful-avoidant. The measure requires participants to state on a 1 $\pm$ 7 scale to what degree each of these statements describes their feeling about relationships with others (friends, family and romantic). High scores indicate a high level of that attachment style.

6.2.3.2 Adverse Childhood Experiences.

The ACE-Q (Felitti et al., 1998) is a ten-item tool that requires users to note whether, prior to their 18th birthday, they experienced any of the ten different types of ACE relating to abuse, neglect, and household dysfunction. Participants are required to provide a "yes" or "no" in answer to each question on the ACE-Q. High scores on this scale indicate that an individual has experienced multiple adverse childhood events.

6.2.3.3 Experiential Avoidance.

Experiential avoidance was assessed in the current study by the self-report measure; BEAQ (Gámez et al., 2014). The measure is a short-form version of the original MEAQ (Gámez et al., 2011) and comprised 15 items as opposed to the 62-items included in the original measure. Items are rated on a 1 $\pm$ 6 scale. Higher scores on the BEAQ are indicative of greater experiential avoidance.

6.2.4 Procedure.

The recruitment process for this study has been highlighted in Chapter 3 (section 3.3.2). As previously suggested, data in this study was collected at the same time as the study included in Chapter 5. As such the procedure for this study can be found in Chapter 5 (section 5.2.4).

6.2.5 Method of Analysis

The current study utilised quantitative methods of analysis. As was the case with the study in Chapter 5, this study initially planned to conduct a multiple regression analysis to

predict patient weight difference over three and six months, however, due to the small sample size this was not appropriate (results from a multiple regression analysis can be found in Appendix I). Instead, a Spearman's rank-order correlation matrix was established to assess associations between attachment styles, ACE, experiential avoidance, and BMI difference over three and six months. Two Mann-Whitney U tests were conducted to assess the difference in BMI over three and six months, between those with higher scores of secure attachment and higher scores of insecure attachment. This was also conducted for those who have experienced one to three ACE and four or more ACE.

6.3 Results

6.3.1 Attachment Style

Participants in the current sample had greater mean scores of insecure attachments (mean = 4.3) compared to secure attachment (mean = 3.6). Participants also had greater mean scores of anxious (mean = 4.1) and avoidant (mean = 4.6) attachment styles compared to secure attachment. The most prevalent attachment style was dismissive-attachment (mean = 4.7) with the least prevalent being preoccupied-attachment (mean = 3.5) (Table 6.2).

Table 6.2
Mean scores of attachment styles.

Variable	Mean	SD
Secure attachment (B)	3.6	1.7
Dismissive attachment (A)	4.7	1.8
Preoccupied attachment (C)	3.5	1.9
Fearful attachment (D)	4.6	1.6
Insecure attachment (A, C and D)	4.3	0.9
Anxious attachment (C and D)	4.1	1.4
Avoidant attachment (A and D)	4.6	0.7

6.3.2 Adverse Childhood Experiences.

All participants in this study had experienced at least one trauma during childhood. The mean ACEs score in this sample was 4.7 (SD = 3.0). Of the 24 participants included in this study, 8 (33.3%) had one to three ACEs, whilst the remaining 16 (66.7%) had four or more. Table 6.3 highlights the prevalence of each type of ACE captured by the ACE-Q. The most common type of ACEs experienced by participants was parental loss (66.7%) with the least common being childhood sexual abuse. The most common ACE associated with child harm was emotional neglect (62.5%). Mean scores on the BEAQ were 57.8 (SD = 15.3).

Table 6.3
Prevalence rates for type of ACE.

ACE Type	Prevalence %
Child Harm	
Verbal abuse	54.2
Physical abuse	50
Sexual abuse	29.2
Emotional neglect	62.5
Physical neglect	33.3
Familial Dysfunction	
Parental loss	66.7
Household domestic violence	62.5
Household substance use	62.5
Household mental illness	33.3
Parental incarceration	33.3

6.3.3 Associations between Attachment Style, ACE, Experiential Avoidance and BMI Difference over Three and Six Months

Spearman's rank-order correlations were run to assess the relationships between attachment styles, ACEs, experiential avoidance, and BMI difference over three and six months. These are highlighted in the correlation matrix below (Table 6.4). Preliminary analysis showed the relationships were monotonic, as assessed by visual inspection of scatterplots. Results from this analysis showed that there was a statistically significant, moderate correlation between secure attachment and anxious-preoccupied attachment styles, $r_s(22) = -.451$, $p = < .05$ and anxious attachment styles overall, $r_s(22) = -.473$, $p = < .05$. There was also a statistically significant, moderate correlation between secure attachment and insecure attachment, $r_s(22) = -.455$, $p = < .05$. There was also a statistically significant, moderate correlation between dismissive-avoidant attachment and fearful-avoidant attachment styles, $r_s(22) = -.603$, $p = < .05$. Whilst there was no statistically significant correlation between anxious-preoccupied attachment and BMI difference over three months, there was a statistically significant, moderate correlation between anxious-preoccupied attachment and BMI difference over six months, $r_s(20) = .515$, $p = < .05$

Table 6.4. *Correlation Matrix for study 3.*

	A	C	D	Insecure	Anxious	Avoidant	ACEs	BEAQ	BMI 3 months (n = 24)	BMI 6 months (n = 22)
B	r_s = .263 *P* = .215	r_s = -.451 *P* = .027*	r_s = -.364 *P* = .081	r_s = -.455 *P* = .029*	r_s = -.473 *P* = .020*	r_s = -.202 *P* = .343	r_s = .071 *P* = .741	r_s = .263 *P* = .214	r_s = .049 *P* = .820	r_s = .078 *P* = .729
A		r_s = -.173 *P* = .418	r_s = -.603 *P* = .002*	r_s = .194 *P* = .362	r_s = -3.78 *P* = .069	r_s = .546** *P* = .006	r_s = .492 *P* = .015*	r_s = -.245 *P* = .245	r_s = -.318 *P* = .131	r_s = -.240 *P* = .282
C			r_s = .352 *P* = .091	r_s = .832** *P* = <.001	r_s = .877** *P* = <.001	r_s = .288 *P* = .172	r_s = .017 *P* = .938	r_s = -.263 *P* = .215	r_s = .330 *P* = .116	r_s = .515 *P* = .014*
D				r_s = .395 *P* = .056	r_s = 7.33** *P* = <.001	r_s = .293 *P* = .164	r_s = -.111 *P* = .605	r_s = .332 *P* = .112	r_s = .184 *P* = .388	r_s = .057 *P* = .802
Insecure					r_s = .788** *P* = <.001	r_s = .761** *P* = <.001	r_s = .270 *P* = .203	r_s = -.179 *P* = .401	r_s = .126 *P* = .556	r_s = .286 *P* = .197
Anxious						r_s = .365 *P* = .079	r_s = -.029 *P* = .893	r_s = -.046 *P* = .830	r_s = .313 *P* = .137	r_s = .397 *P* = .067
Avoidant							r_s = .416* *P* = .043	r_s = -.012 *P* = .956	r_s = -.149 *P* = .486	r_s = -.134 *P* = .553
ACEs								r_s = -.083 *P* = .700	r_s = .030 *P* = .889	r_s = .112 *P* = .621
BEAQ									r_s = .342 *P* = .101	r_s = .143 *P* = .526

*Note * = <.05, ** = <.01. B = secure attachment, A = dismissive-avoidant, C = anxious-preoccupied, D = fearful-avoidant*

6.3.4 Number of ACE

A Mann-Whitney U test was run to determine if there were differences in BMI change over three months between patients with one to three ACEs and four or more ACEs. Distributions of BMI for patients with one to three ACEs and patients with four or more were similar, as assessed by visual inspection. Body Mass Index change over three months was not statistically significantly different between patients with one to three ACE (*Mdn* = 0.35) and patients with four or more ACEs (*Mdn* = 0.20), $U = 57.5$, $z = -0.399$, $p = .697$. The same test was run to determine if there were differences in BMI change over six months between patients with one to three ACEs and four or more ACEs. Distributions of BMI for patients with one to three ACEs and patients with four or more were similar, as assessed by visual inspection. Body Mass Index change over three months was not statistically significantly different between patients with one to three ACEs (*Mdn* = 0.60) and patients with four or more ACE (*Mdn* = 0.70), $U = 50.5$, $z = -0.141$, $p = .891$.

6.4 Discussion

The current study aimed to explore if attachment styles, ACEs scores and levels of experiential avoidance in secure psychiatric inpatients were associated with weight difference over three and six months. A key finding in this study was there was a higher scores of avoidant attachment styles (Mean = 4.6, SD = 0.7) such as dismissive-avoidant (Mean = 4.7, SD = 1.8) and fearful-avoidant attachment (Mean = 4.6, SD = 1.6) compared to anxious-preoccupied (Mean = 3.5, SD = 1.9) and secure attachment styles (Mean = 3.6, SD = 1.7). This is a finding that is also mirrored in other study populations of secure psychiatric inpatients (Timmerman & Emmelkamp, 2006). High rates of avoidant attachment in this sample may be explained by a high proportion of patients with several ACEs (Fosse et al.,

2021), as was found in this study. The mean number of ACEs in the current study was 4.7. Previous literature suggests that the presence of four or more ACEs is associated with a 2.2-fold increased risk of engaging in an unhealthy diet (Bellis et al., 2016). The mean ACEs score in this sample was 4.7, which shows that this sample of secure inpatients may be likely to have an increased risk of having a poor diet (Bellis et al., 2016). For example, Bellis et al. (2016) highlighted that four or more ACEs is associated with a 2.2-fold increase in health-harming behaviour associated with obesity.

The mean ACE score in this study is more than double than what has been reported in other secure psychiatric inpatient populations (Booth & Stinson, 2015). However, there is limited research exploring the prevalence of ACEs in secure inpatient settings; with the only published study in this area using a secure population in Missouri, United States (Booth and Stinson, 2015). Previous research has found that in the general population, US samples (Murphy et al., 2014) have more ACEs than Welsh samples (Bellis et al., 2016). It may be that the current study had a sample of patients with a high concentration of ACEs, which is exacerbated by the small number of participants. It may be that if this sample size was greater, there would be a more representative spread of ACE scores.

The sample of secure psychiatric inpatients in the current study had high rates of experimental avoidance (mean score of 57.8 on the BEAQ). Gámez et al. (2014) highlights that their sample of psychiatric population also had high BEAQ scores. However, it is important to note that Gámez et al's. (2014) research used outpatient samples of individuals with SMI and therefore their results may not be a directly comparable with the current study's population. Nonetheless, the level of experimental avoidance scores in this sample of patients does suggest the environment within secure services may have little bearing on

patient's levels of experiential avoidance, rather it seems that experiential avoidance is more influenced by an individual's mental health. However, this is not to say that high rates of experimental avoidance in a secure setting does not have an influence on patient's weight; within secure settings patients have unrestricted access to high calorie snack foods. It is plausible that the accessibility of high calorie foods and the high levels of uncontrolled and emotional eating seen in secure inpatients work additively to promote weight gain and obesity maintenance, particularly if these behaviours are used to avoid the difficult thoughts and feelings associated with their mental ill health.

This current study found a moderate positive relationship between levels of anxious-preoccupied attachment and patient weight gain over six months. This relationship may be explained by previous research that suggests individuals who have an anxious-preoccupied attachment style are prone to binge eating episodes (Pace, Cacioppo & Schimmenti, 2012; Shakory et al., 2015). Shakory et al. (2015) suggested that binge eating behaviour can be an expression of emotion regulation deficits. The extent which participants in this sample engage in binge eating is unknown, however the findings in Chapter 5, have highlighted that patients did have high levels of uncontrolled and emotional eating which suggest a pattern of dysregulated eating. It therefore appears that secure inpatients with higher levels of anxious-preoccupied attachment also are prone to binge eating behaviours such as uncontrolled eating.

Findings from this study highlight some potential implications for individual treatment plans and wider secure service design. With regards to the former, the increased risk of health harming behaviours associated with greater number of ACEs (Bellis et al., 2016), suggests that it may be prudent for individual care and treatment plans to highlight those more at risk

of gaining weight as a result of their increased exposure to early experiences of trauma. For these individuals, it may be that staff need to monitor closely their weight and eating behaviour whilst receiving treatment in hospital.

Concerning implications for wider service design, the association between anxious-preoccupied attachment and BMI increase suggests that it may be appropriate for services to adopt tools to identify psychological markers of weight gain for patients upon admission. This is also true of the findings from the study in Chapter 5, whereby levels uncontrolled and emotional eating where associated with BMI increase. A tool used to establish markers that are associated with a risk of weight gain could identify patients who may be more at risk of gaining excessive weight whilst being treated at hospital and could inform their care and treatment plan. However, currently there does not appear to be a tool that has been established for use within secure services. Further research should focus on designing an appropriate tool for identifying psychological markers of weight gain risk within secure services.

6.4.1 Limitations

Besides the limitations already addressed in Chapter 5, there are several limitations to consider when interpreting the results from the current study. These particularly relate to the measures used. For example, the RQ is a commonly used measure of attachment, however, relies of user's self-report to identify levels of specific attachment styles and therefore may be a less robust measure compared to other measures of attachment such as the AAI-II, which involves a in depth interview with the participant. Despite this, literature does suggest the RQ has good internal consistency and test-retest reliability and so is still a robust attachment measure. Given the size and requirements of the measure it is also easy to administer. This is

particularly beneficial when research is being conducted on a vulnerable population and when there are several other measured being utilised in the same study. Regardless, further research that explores the role of attachment in secure psychiatric inpatient obesity should perhaps use measures like the AAI-II that negate issues associated with self-report.

The issue of self-report also extends to that of the ACE-Q, whereby patients were required to recall previous traumatic experiences. Not only could this have produced psychological distress for participants but may also have resulted in inaccurate scores on the ACE-Q where patients may not have wanted to disclose, remember, or think about past traumatic experiences. Psychological distress was negated for patients in this study however, with the researcher disclosing prior to completion of the ACE-Q that questions of a very sensitive nature will be asked, and that the patient did not have to answer them if they did not want to. A more reliable measure of recording ACEs may be through patient medical records which, within psychiatric services, generally have extensive details on patient's psychosocial history and upbringing.

6.5 Summary

In the current study, the only variables that were associated with weight gain were higher levels of anxious-preoccupied attachment. This association was only over six months. No other study variables were associated with weight gain. These findings would suggest that it is possible that there are other underlying factors that are influencing patient's poor physical health. There is a literature based that proposes that the environment, particularly that of the secure psychiatric service itself, can have a significant, negative impact on patient's physical health. Chapter 7 attempts to elucidate what factors within a secure psychiatric service may impact on patient's physical health, particularly obesity.

6.6 Key findings

- Secure attachment was lower in current sample compared to samples of adult males. Insecure attachment was higher.
- Participants in this sample had greater levels of dismissive-avoidant and fearful-avoidant attachment styles compared to anxious-preoccupied and secure attachment.
- The majority of patients had for our more ACEs.
- The level of experiential avoidance in this study sample was similar to psychiatric outpatients and greater than samples of students and community adults.
- There was a significant, negative correlation between secure attachment and anxious-preoccupied attachment scores.
- There was a significant, positive correlation between dismissive-avoidant attachment and fearful-avoidant attachment scores.
- There was a significant, positive correlation between anxious-preoccupied attachment scores and BMI difference over six months.

Work Package 3

Chapter 7: Environmental Factors and Obesity in Secure Psychiatric Services.

7.1 Introduction

Secure psychiatric inpatient services are designed to keep patients and the public safe. Patients are placed within a secure psychiatric inpatient service because they are deemed a danger to themselves or others, because of poor mental health and require to be detained under the Mental Health Act (1983/2007) (Kennedy, 2002). Within these services patients are provided pharmacological, psychological and occupational interventions to improve their mental health, improve their quality of life and reduce their risk to themselves and the community (Kennedy, 2002). Some of the interventions, including the physical and procedural controls inherent in the service design, are applied without patient consent, under the Mental Health Act. For this reason, secure psychiatric inpatient services are restrictive, in that patients are not permitted to take leave outside the service without permissions, sometimes only with approval from the Ministry of Justice, and often with an escort (Kennedy, 2002).

There are varying degrees of leave that a patient can be permitted, from unescorted leave to towns surrounding the service, to those more restricted such as leave within secure gardens and within line of sight for staff members. Many patients within secure psychiatric services are not permitted leave at all. This is usually because they are acutely unwell, their risk of abscond or to cause harm to themselves or others is too high, or there is not enough information gathered around their risk to make an informed decision. These patients are therefore much more restricted than those with leave. According to Bacon, Farnworth and

Boyd (2012) physical, legal and institutional barriers that exist for secure psychiatric inpatients can have a negative impact on patient weight and this is primarily because of a reduced access to exercise.

To offset these issues and to promote the health of patients generally many secure psychiatric services have implemented facilities so that patients can obtain an optimal amount of exercise. These include gymnasiums, sports halls and, in some cases, astro-turf facilities within the service grounds. Occupational therapists and their assistants utilise these spaces for planned activities with patients. Unfortunately, a common theme within secure psychiatric services is high levels of staff shortages (Cormac, Ferriter & Buchan, 2013; Day & Johnson, 2017; Haw & Stubbs, 2011; Rabab et al., 2020; Rimmer, 2018). Due to issues surrounding risk, patients must be escorted to these facilities. In the absence of adequate staffing, physical activity sessions are likely cancelled or rescheduled. For those with mental health problems, who are likely already unmotivated to take part in physical activity because of their psychotic illness and sedative effects of psychotropic medication (Day & Johnson, 2017; Haw & Stubbs, 2011; Long et al., 2015), the expectation that gym sessions are going to be cancelled may lead to apathetic attitudes and a further reduced motivation to engage in physical activity. Furthermore, as highlighted in Chapter 1 (section 1.1) many patients within psychiatric services experience low self-esteem and increased levels of stigma as a result of being overweight. These are also exacerbated by their mental health. For many patients, the idea of taking part in physical activity within a group may be very unappealing, due to their low self-esteem (Vancampfort et al., 2011).

7.1.1 Accessibility of Palatable Foods in Secure Services

Besides the reduced accessibility and a lack of motivation to engage in physical exercise, many secure psychiatric services lack the facilities that allow patients to produce healthy meals (Prebble et al., 2011). This is coupled with easy access to high calorie foods, with on-site patient shops holding high calorie foods (Harper, Ferriter & Cormac) and a large proportion of patients regularly consuming takeaways (Kasmi, 2009). This is even though secure services have, or should have, access to and input from a dietitian (Department of Health, 2000; Haw & Stubbs, 2011). More recently, Public Health England (2021) established food standards that outline how patients can improve their diet whilst they are treated in secure hospital. Whilst these standards are comprehensive in that they do not just look to change the diet to improve physical health, there is, however, a clear gap in policy as these standards do not address the multifaceted and complex nature of obesity in people in people with SMI.

Alongside these new guidelines, individuals may adopt their own strategies to negate issues regarding access to high calorie foods (Oakley et al., 2013). Oakley et al., (2013) explored interventions used by 45 secure hospitals in the UK. A key component of reported weight management strategies implemented within secure settings were to limit access to unhealthy foods (in particular, this involves the restrictions on purchasing takeaways, or placing a limit on the amount of high calorie food and beverages that can be purchased from shops). Whilst Oakley et al's. (2013) work does not provide information on the efficacy of limiting access to unhealthy foods, they do report that 39 of the included secure services believed that limiting access to unhealthy foods was key to managing patient obesity. Despite this, more than 50% of the hospital settings reviewed in the paper had no restrictions on the

amount of food that visitors could bring in for patients and only a quarter of these settings placed restrictions on food that could be consumed whilst patients were on escorted leave.

The reasons for inconsistent practice within settings is likely to be because food choice and food availability is a complex issue for services to navigate, as patients have rights protected by Article 8 of the European Convention on Human Rights (1952) and the Human Rights Act (1998). Complying with the Human Rights Act (1998), the Mental Health Act (1983) limits the power that Responsible Clinicians have to override patient choice and decision making. It has also been argued that too many restrictions on patient autonomy, can have negative effects on integral elements of patient rehabilitation (Mezey et al., 2010). Day and Johnson (2017) propose that a keyway to overcome such issues would be to include patients in the discussion around ward-level policies.

7.1.2 Integrated Health Care in Secure Psychiatric Services

Many secure services report that they have made active attempts to reduce the number of unhealthy foods that patients consume and increase patient engagement in exercise (Day & Johnson, 2017). This may be because of a push to bridge the gap between physical health and mental health in secure psychiatric services (Naylor et al., 2016). For example, in 2016 a King's Fund report on integrated care initiatives, it was identified that there was a significant issue with cohesive mental and physical health care in psychiatric services (Naylor et al., 2016). Within the report, the authors note that the culture within psychiatric inpatient services places physical health low on the list of treatment priorities. In fact, it is rare to find physical health services operating within psychiatric inpatient facilities despite the significant need (Naylor et al., 2016). There also exists a significant body of academic literature highlighting

the outcome of poorer physical health in those with long term mental health problems (Annamalai, Kosir & Tek, 2017; Bodenlos et al., 2011; Chant & McGrath, 2007; Donnadieu-Rigole et al., 2016; Gray, Hughes & Bressington, 2016; Harris & Barraclough, 1998; Hennekens et al., 2005; Laursen, Munk-Olsen & Vestergaard, 2012; Ösby, et al., 2000; Petry et al., 2008; Subashini et al., 2011; Tay, Nurjono & Lee, 2013; Zareifopoulos et al., 2018; Zolezzi et al., 2017). It has been proposed that a reason for an absence of focus on physical health is that mental health professionals may lack the skills or confidence that is necessary to identify physical health issues (Forsyth, Elmslie & Ross, 2012; Johnson et al., 2018; Naylor et al., 2016) or that staff do not feel that it is within their job description to facilitate physical health interventions (Long et al., 2015; Prebble et al., 2011; Rylance, Chapman & Harrison, 2012).

This is noted particularly in qualitative studies that have been conducted with mental health nursing staff (Faulkner & Biddle, 2002; Forsyth, Elmslie & Ross, 2012; Rylance, Chapman & Harrison, 2012). For example, Forsyth, Elmslie and Ross (2012) suggest that nursing staff have a poor knowledge of nutrition and often give nutritional advice that is incorrect or from unreliable sources. The authors note that this is largely due to nurses having a lack of formal training around nutrition. Furthermore, Rylance, Chapman and Harrison (2012) highlighted that many nursing staff perceived the treatment of physical illnesses as outside of their job role and reported that when a patient experiences a physical illness that they would refer them elsewhere (Rylance, Chapman and Harrison, 2012). These ideas were echoed in a further qualitative study of mental health nurses conducted by Faulkner and Biddle (2002). Here the authors identified that nurses felt that physical activity was the individual's patient responsibility and not necessarily the responsibility of nursing staff.

This may explain why 35% of patients fail to receive a physical examination within 24 hours of admission (Vanezis & Manns, 2010). However, this figure may not be as relevant today given that people with obesity have a greater risk of mortality following infection with the highly prevalent SARS-CoV-2 virus (Klang et al., 2020), as secure services may increase their physical health screening to identify patients who are most at risk (Basrak et al., 2021).

Nursing staff perspectives are at odds with recommendations made in The King's Fund report for an integrative approach to care within psychiatric inpatient services; as this is thought to lead to positive patient outcomes both in terms of their mental and physical health (Naylor et al., 2016). Some studies suggest that the way to do this is to integrate more physical health professionals into psychiatric inpatient care such as emphasising the importance of positive role modelling, as this can have beneficial effects on patient physical health behaviour change (Bacon, Farnworth & Boyd, 2012; Cardinal, 2001; Cormac et al., 2004; Day & Johnson, 2017; McQuaid et al., 2000). However, the extent to which healthcare staff are appropriate role models of health lifestyle can be questioned, as in the UK there is a high prevalence of obesity in healthcare workers (25% of nurses and 32% of care workers in England) (Kyle et al., 2017).

7.1.3 Considering the Environment in Terms of Patient Weight Gain in Secure Services

The studies included in work packages 1 and 2 of the current thesis have explored the role that patient demographic, clinical, pharmacological, psychological and cognitive factors play in secure inpatient weight gain. Whilst these studies have highlighted potential contributors to patient obesity, the results from these chapters all indicate that there are likely to be other factors at play. In the current study, staff members are interviewed to discuss their views on

the secure psychiatric environment and how this may have an impact on patient's physical health. Staff members were used in this study due to the close contact with patients and the amount of time spent within secure services. It was believed that staff members would offer a valuable and rich insight into the secure environment and how it may impact patient's physical health for these reasons. Patients voices were not included in this study because (1) the issue of obesity in secure settings is a sensitive topic for many patients and having in depth discussions about this may negatively impact patient's mental health, and (2) given the vulnerable nature of the target population in this thesis, the researcher has aimed to use the least imposing and invasive methodology possible, to maintain relational security within the service and avoid exacerbating mental health problems.

With that in mind, a qualitative study was designed to identify themes associated with the secure environment that may explain the obesity problem seen in secure psychiatric inpatient settings. Earlier in this thesis there are three studies that have utilised quantitative methods to attempt to explain patient weight gain and obesity. It was felt that the use of qualitative methods in this case would offer richer detail about the secure psychiatric environment and its impact on patient physical health. Furthermore, several studies conducted within secure psychiatric services have adopted qualitative approaches when using staff populations (Bacon Farnworth & Boyd, 2012; Faulkner & Biddle, 2002; Forsyth, Elmslie & Ross, 2012; Rylance, Chapman & Harrison, 2012).

7.2 Methodology

7.2.1 Participants

Participants were recruited via purposeful sampling of staff members at one medium and one low secure psychiatric inpatient service in South Wales. Staff members were recruited from several departments within the service to reflect the range of professions that exist within secure settings. These professions included: psychology, medicine, occupational therapy, social work, nursing staff and healthcare assistant. These professions were chosen because they have high levels of patient contact and would be involved in supporting patient's mental and physical health. As a result of the pragmatic nature of the current project, the researcher collected as many interviews as possible after advertising the study.

7.2.2 Design

The study design was a qualitative, semi-structured interview design. Data was analysed using Thematic Analysis. Thematic analysis is a qualitative research method that involves identifying patterns of data, analysing these patterns, organising them and then reporting them in rich detail (Braun & Clarke, 2006).

7.2.3 Materials

The current study used individual semi-structured interviews to collect staff perspectives on weight management. This approach was selected because of the flexibility inherent in this method of data collection, which can allow for deep exploration of thoughts and experiences on the subject area (Braun & Clarke, 2006). An interview guide was developed (see Appendix G) which was comprised of questions surrounding the secure service environment

and how it may influence poor physical health. The interview guide was developed to include key features that have been found to contribute to patient weight gain in the published literature outlined in section 7.1. Interviews were recorded using a KINOEE digital voice recorder and were transcribed and stored on an encrypted laptop. Interview transcripts were analysed using NVivo qualitative data analysis software package (QSR International, 2020). Transcripts can be found in Appendices J to V.

7.2.4 Procedure

Participants in this study were recruited via e-mail. The researcher sent a service wide e-mail inviting potential participants to take part in a short interview regarding patient physical health. It was stated that interviews would be conducted on a 1-to-1 basis and would take approximately 20-30 minutes. The researcher included their contact details and suggested that if potential participants were interested in taking part, or if they had any questions regarding the study, then they should get in touch with the researcher. Within the invite e-mail it was also noted that use of a recording device would be a necessary component of the study interviews and that these recordings would be transcribed with any personally identifiable information being removed from the study transcript. Potential participants who declared their interest to take part in the study were contacted to arrange a suitable time and location to conduct interviews. Upon arrival at the study site, participants were reminded that interviews would be recorded. Participants were also advised that if they did not wish to answer any of the interview question then they did not have to and could notify the researcher if they wished to withdraw participation from the study at any time and without reason. At this point the researcher collected verbal consent.

Participants interviews were guided using the interview guide in Appendix G. Following the interviews, participants were debriefed. Interviews were transcribed at the next earliest convenience. An encrypted Excel spreadsheet was created that included the participants name, their profession and a unique study number assigned to their transcript. This spreadsheet was stored on a secure network drive within the service. Interview transcripts were later analysed using a qualitative analysis software tool, NVivo (QSR International, 2020).

7.2.5 Method of Analysis

This method of analysis was chosen over other commonly used qualitative approaches, i.e., Grounded Theory or Independent Phenomenological Analysis, because unlike these approaches to qualitative research (Charmaz, 2006; Smith, Flowers & Larkin, 2009), Thematic Analysis does not depend on pre-designated theoretical frameworks (Taylor & Ussher, 2001). As a result, it is a more accessible approach to qualitative data analysis (Braun & Clarke, 2006). Furthermore, unlike other qualitative approaches, Thematic Analysis provides a rich theme-based description of the whole data set. This makes it a useful approach when exploring new and developing areas of study, much like what is done in the current study. This method was also chosen because it is commonly used within health-related research. Furthermore, Thematic Analysis provides a consistency and structure to cumbersome data such as interview transcripts. It has been argued that the systematic approach to analysis found when using Thematic Analysis increases the objectivity of the research which allows the replication of the research process (Roberts et al., 2019).

The approach to Thematic Analysis in this study was undertaken in line with steps established by Braun and Clarke (2006). This method involved the reading of interview transcripts several times to identify potential themes and gain familiarity with the data. Following this, codes were assigned to quotations that were potentially of interest. At this stage, the author used these codes to produce higher level sub-themes, whilst maintaining the diversity of the initial codes. An inductive approach was taken when producing themes in this study. This meant that the researcher approached the data without any preconceived themes that would be expected to emerge based on the existing knowledge established in the literature and instead allowed the data itself to determine the study themes. The third stage involved the identification of codes that were congruent with the enveloping themes. To check the consistency of these themes, a second, independent reviewer analysed four study transcripts, coding and then theming these codes. The themes produced in stage three were then reviewed in the fourth stage before defining and naming them. The write up of the study report then began following the finalisation of themes.

7.3 Results

7.3.1 Participants

The frequencies of each profession or job role are reported in Table 7.1. The participant sample included ten females and three males.

Table 7.1.
Frequency of participant profession in study.

Participant Profession	Frequency
Nurse	2
Social worker	1
Occupational Therapist	1
Medical professional	3
Psychologist	4
Healthcare Assistant	2
Total	13

Analysis of transcripts obtained from interviews with these participants produced three core themes. These core themes, as well as their sub-themes, are highlighted in the thematic map, below (Figure 7.1).

Figure 7.1. Maps of themes identified in analysis.

7.3.2 Secure Psychiatric Service Culture

It was apparent from the interviews that "normal" practice within the secure psychiatric service was to prioritise mental health needs over physical health. This service experienced frequent staff shortages, often staffing was not arranged to cover activities or services related to the physical heath of patients. As such, "mental health as a priority", "patient restrictions"

and "staff shortages" were identified as sub-themes to "Secure Service Culture" and are discussed in detail below. Table 7.2 highlights the number of participants whose responses were coded to each of these subthemes.

Table 7.2
Number of participant responses included in "secure service culture" sub-themes.

Sub-theme	Number of participant responses	Example quotation
Mental health as priority	5	"*We need to be focusing on their mental health needs and stuff that's what our job is*" (nurse, T13, lines 104-105, Appendix V)
Patient restrictions	11	"*…some people are confined… to the ward environment*" (psychologist, T1, line 15, Appendix J)
Staff shortages	4	"*Yeah, I mean they haven't had a gym induction, but it's been like a logistical thing like staffing and stuff which has been the problem*" (medical professional, T12, lines 88 – 89, Appendix U)

7.3.2.1 Mental Health as Priority

Staff perspectives indicated that the culture of the secure environment lead to patient's mental health being prioritised over physical health concerns.

> "*…by and large in this profession, particularly in this setting with mental health, the physical health very much becomes a secondary issue, if not 3rd and 4th in terms of priority.*" (nurse, T6, lines 43-45. Appendix O)

One possible reason for this sense of prioritisation was that nursing staff did not view treatment of physical health as part of their professional role. The following quote reveals that although nurses were aware that patients experienced a decline in their physical health they were unwilling to take responsibility for this aspect of their care

> "*…there always has been a very strong resistance amongst the work force that they don't see that within their remit really and I don't know why that is,.*" (Nurse, T6, lines 163-165)

> "*We need to be focusing on their mental health needs and stuff that's what our job is…*" (nurse, T13, lines 104-105, Appendix V)

Despite this reluctance to treat physical health, the interviews highlight that mental health nurses working with the service anticipated that the needs of patients were changing, and that there increasing number of patients with co morbid physical health conditions (many of which were related to underlying obesity).

> "*We are going to be in a position where we have a service where 100% of the patients are morbidly obese and we are not trained as psychiatric nurses to deal with the amount of physical health problems that we would have to deal with.*" (nurse, T13, lines 101-103)

> "*You might end up with gangrenous wounds and toes falling off, you're doing dressings on people you've never had to consider before as a mental health nurse.*" (T6, lines 151-153)

Reluctance to manage patients physical health appeared to stem from mental health nurses perceiving that they lacked training in physical health care. It was suggested by this member of staff that to overcome this issue nurses should have proficiency in the skills needed to treat both mental and physical health:

> "*…I think you need almost more of a generic [nurse] training course that have both of them [physical and mental health]…*" (lines 176-177)

7.3.2.2 Patient Restrictions

Many of the healthcare professionals in this study felt that the restrictive nature of secure environment was contributing to weight gain. A low "number of leaves" (time outside of the ward environment) was perceived as reducing opportunities to engage in health promoting activities such as using the gym or walking. Restrictions also influenced patient's access to food preparation spaces, which mean that they were unable to independently cook meals:

> "S*ome people are confined really to the ward environment…*" (psychologist, T1, line 15, Appendix J)

> "S*o when they are admitted obviously, they are quite restricted…*" (psychologist, T3, line 17)

> "*…people don't have access to the kitchen*" (psychologist, T2, line 33)

"…I think a few of them might be registered with a local gym but then obviously they've got to be able to have their leave to go to the gym…" (medical professional, T12, lines 90-91, Appendix U)

Staff felt that restrictions placed on patient's decreased their access to pleasurable activities which in turn precipitate unhealthy eating. They viewed patient's lifestyle choices as a reflection of the fact that they were often bored or lacking social contact:

"*Well they don't get to see their family, they don't see their friends if they have any, they can't go to the shops or the pub or anything…*" (healthcare assistant, T10, lines 80-81, Appendix S)

"*…so, for a lot of them their smoking is going to be restricted so they are eating to make up for that…*" (medical professional, T12, lines 31-32)

The interviews revealed that despite staff identifying the restricted nature of the setting as being an important factor in patient weight gain, they viewed such restrictions on personal liberty to being necessary and appropriate. Staff indicated that the highest restrictions were placed upon patients who were at significant risk of harm to themselves or others and that this may have an unintentional impact on the individual's vulnerability to weight gain. The types of restrictions that were common increased the obesogenic nature of the setting as they prevented or limited individuals' access to physical activity, green spaces and also to food preparation.

"*…it's all dependent on risk … so some people may come and be granted astro-turf [leave] straight away…*" (lines 20-21)

"*…I think there is a lot going on if you have external leaves and I think there's more that we could do internally.*" (occupational therapist, T8, lines 140-141, Appendix Q).

"*…so some patients will have more kitchen access because their risk is lowe*r…" (T12, lines 55-56).

The statement above was made in the context of discussing patient's ability to access snacks from the shared kitchen facilities. It may be that access to the kitchen to "*help themselves to tea and coffee*" (T12, line 56) may exacerbate weight problems as there may be unrestricted access to sugar and milk in this context.

7.3.2.3 Staff Shortages within Services

Low staffing levels that are seen within secure services may also have an influence on patient weight gain because it impacts their access to facilities that improve their physical health. Staff perspectives revealed that although they would like patients to have increased access to activities such as the gym or gardens but that these changes would be beyond their control as were related to staffing resources

"*Yeah, I mean they haven't had a gym induction, but it's been like a logistical thing like staffing and stuff which has been the problem…*" (medical professional, T12, lines 88 – 89)

"*…I'd like to see more people just getting out in the gardens for regular walks every day and I think that would be really hard to do with the current amount of ward staff…*" (occupational therapist, T8, lines 136-137).

Staff shortages were also viewed by a nurse as impacting on patient's access to physical health appointments. The following quote highlights that the lack of staffing could be a safety concern as it led to a patient missing healthcare appointment:

"…these [physical health] problems are compounded when you have a transferred prisoner who needs 4:1 escorting to physical health appointments to address these issues that we can't get them to because we don't have the staff to get them there, so they are cancelling more and more. We had a letter back yesterday about a patient who wasn't able to make an appointment for a particular on-going issue due to staff levels and they have been taken off the treatment list as a result…" (T6, lines 185-190)

7.3.3 Food Culture

Analysis of highlighted that a specific culture surrounding food exists within the secure psychiatric service. This theme was divided into three sub-themes (see Figure 7.1) that encapsulate the facets of the food culture within these services and how these may be contributing to the weight gain. These sub-themes include "accessibility of food", "hospital food", and the "normalisation of unhealthy behaviours". Table 7.3 highlights the number of participants whose responses were coded to each of these subthemes.

Table 7.3
Number of participant responses included in "food culture" sub-themes.

Sub-theme	Number of participant responses	Example quotations
Accessibility of food	9	"*…he [patient] will go and spend X amount of money in the patient shop, y'know binge on- he was saying he'll just eat 4 packets of crisps and a large bar of chocolate in 10 minutes*" (psychologist, T1, lines 96-98, Appendix J)
Hospital food	8	"*I think that they are fairly limited for choice umm and people often complain 'awh we've had cold tea four nights this week'…"* (psychologist, T1, lines 55-58, Appendix J)
Normalisation of unhealthy behaviour	5	*if they compared themselves against a healthy outgroup, they may be more inclined to be more conscious about their weight gain*." (psychologist, T3, lines 76-81, Appendix L)

7.3.3.1 Accessibility of Food

Easy access to high calorie foods is likely to be a contributing factor to patient weight gain within secure services. This is an issue that was highlighted by the majority of participants in this study who raised concerns about the type of foods that are available to purchase within the onsite shop.

> "*…he [patient] will go and spend X amount of money in the patient shop, y'know binge on- he was saying he'll just eat 4 packets of crisps and a large bar of chocolate in 10 minutes…*" (psychologist, T1, lines 96-98)

"…obviously there's a patient shop on site as well … I know there are treats … Umm I guess close to here, there's not a huge amount of shops within walking distance for a lot of people. The garage is one but again I'm not sure, it's quite expensive and variety is limited, umm again you would expect there to by quite sugary foods there, crisps, chocolates and sweets." (Psychologist, T2, lines 42-47)

"…the food in the patient shop isn't great … I think that's uh-there's limited, short of getting fresh fruit and vegetables, there's limited kind of-even the healthy snacks aren't that heathy, umm I don't think a shop like that could provide stuff like that." (occupational therapist, T8, lines 111-114)

Staff highlighted that patients would often purchase unhealthy foods in local shops during their leave from the hospital. Staff responses emphasises that they felt a sense of conflict between encouraging patients to engage in activities outside of the ward and trying to promoting healthy eating. For example:

"*Yeah so OT do have loads of stuff going on … [such as] leaves to the garage – although they usually buy junk [food] from there…*" (healthcare assistant, T11, lines 88-90).

Patients within these secure services also had regular access to takeaways. Staff highlighted that it was common for patients to spend significant amounts of money on fast foods and snacks:

"They get meals provided for them right and then you see them snacking all evening and then we have takeaway nights, and some people are spending £30+ on food for themselves …. You look at the snacks they are eating as well, it's not as if they are eating lettuce for a snack some of the guys are eating multi packs of crisps in one go like." (health care assistant, T10, lines 22 – 26)

7.3.3.2 Hospital Food

Eight of the participants believed that the amount of choice, the quality and the time that food that was provided to patients by the hospital could be significant contributors to patient weight gain. The services provide breakfast, lunch and dinner for patients and these meals were outsourced by catering companies and serviced by housekeeping staff. Patients are provided with a weekly menu with several options to choose from for each day. Healthcare professionals highlighted that the amount of choice and variety patients are given is poor and may be why patients end up consuming more interesting and palatable snacks after these mealtimes:

"I think that they are fairly limited for choice umm and people often complain 'awh we've had cold tea four nights this week', I don't know whether it's just sandwiches and stuff umm and then people go and binge, y'know crisps, biscuits and things like that so I'd say that." (psychologist, T1, lines 55-58)

"…it's gone through lots of different phases and I do know that when we were in the old building that patients would complain that they knew what day it was by the meal they were having and there was a 2 week revolving menu and it was really boring,

very beige, very stodgy, very carbohydrate laden…" (medical professional, T7, lines 44-47)

"…I think it's [the weight gain problem] the type of food we serve people … it is very much sort of around the very beige food, there's not a lot of, what I'd see as sort of healthy fruit, vegetables more raw stuff, I don't think there is an awful lot of things like that like fish, unless it's highly battered, then it's reliant on carbohydrates - so there is the healthy option, I've not seen it in use and if it is people don't seem to be choosing it." (T7, Lines 9-15)

There is a large amount of time left between scheduled mealtimes and this may mean that patients are snacking in order to feel more satiated. This is supported by the following quotation:

"…I think that … the way that we provide meals isn't great … I think that the timing of the meals, so they have lunch at 12:30 and then dinner at 16:30, big meals, and there's no way to get from 16:30 to bedtime without being really hungry and they do provide snacks on there but, I don't know personally I feel that you end up eating a lot of food or a day's diet worth of food squashed into this-this small [9-5 work related timing schedule] …. And they end up hungry in the evenings and overeating because of that, because the only way to do that healthily would be to eat your three meals and then fast for the remaining time and I don't think anybody could really do that." (occupational therapist, T8, lines 32-43)

7.3.3.3 Normalisation of Unhealthy Behaviours

Despite staff highlighting concerns around the amount of unhealthy foods consumed by patients, participants revealed that as a service the issue of obesity was not openly addressed. In fact, it was suggested that being overweight or obese was actually in normalised within services. The following quote illustrates how high body weigh had become normalised by both patients and staff:

> *"…if they come in on the ward and they are, well not thin but healthy, if they are seeing people bigger than them they may be more comfortable gaining the weight if other patients are bigger than them and they may not perceive themselves as, not abnormal, but different from everyone else. Whereas if they compared themselves against a healthy outgroup, they may be more inclined to be more conscious about their weight gain*." (psychologist, T3, lines 76-81)

There may be an expectation amongst members of staff that patient's will always gain weight upon admission. This may make it more noticeable when patients do not gain weight or indeed lose weight. This is supported by one participant:

> "…i*f people don't [gain weight] that's kind of more noticeable … I saw a male patient that I saw on admission, and I was struck by him, hasn't put a lot of weight on.*" (psychologist, T2, lines 19-22)

It is not only visual markers related to obesity that appear to be normalised within secure services. Patients within secure services consume healthy foods and are usually unchallenged

by members of staff, or indeed, their fellow inpatients. Indeed, conversations about food and snacking were often used as a way to build rapport between staff and patients:

> *"…whenever I finish a session with a patient I always ask, 'what have you got planned for the rest of the day?' and they say 'going to the shop to get some pop' – the conversation I am going to get every time. 'Oh, I'm going to go up the garage to get some crisps', every time I ask a patient that's always- or going to OT, cookery*." (psychologist, T4, lines 48-51, Appendix M)

The consumption of unhealthy foods within secure services was sometimes considered as a form of emotional expression. For example, one of the psychologists indicates that sharing of food had a social role and could be viewed as strategy that helped individuals develop social connections:

> "*…it's kind of modelling that food is the predominant way to express something, whether it's gratitude or whatever…*" (psychologist, T1, lines 50-52)

> "*…eating is a big part of how people socialise and kind of sooth umm how they spend their time, what they think about, so you know it's a big feature … people talk about food a lot.*" (psychologist, T2, lines 64-66)

Snacking and unhealthy food choices are commonplace amongst members of staff, despite the importance of staff modelled positive behaviour. In fact, some members of staff openly acknowledged that they were often poor role models for healthy eating:

"…I also think that a lot of the staff aren't reflective of a very healthy eating lifestyle and if they are eating those sorts of foods, it's social modelling which-its telling patients that's it's okay to eat those types of foods. In clinical team meetings you have biscuits, cookies, chocolates all in the middle of the table and we'll have a patient come in and their weight might be brought up about them needing to lose a bit of weight and yet we are sitting there eating cookies and biscuits in front of them and our service is all based on social modelling and yet we don't seem to understand that social modelling is also important in terms of food." (psychologist, T3, lines 24-31)

The participant also stated later in the interview, that:

"…I do think some staff might not have that attitude to be eating healthy so how can we expect patients to be eating healthy as well … I think the staffs actions should change to positively influence the patients as we should encourage patients to be better so like, I have been to a [Clinical Treatment Plan meeting] where they have talked about a patient being within the obese bracket based on their BMI yet, a few staff there are bigger than the patient and it's like well if they are looking at us and they think well who are you to tell me I am fat when some of you are fat…" (lines 65-71)

7.3.4 Poor Mental Health

Another key theme identified in this study relates to participants poor mental health. The nature of a secure psychiatric service means that many of the patients hare diagnosed with a serious mental condition. This theme was categorised into three subthemes "psychosocial

factors", "low motivation", and the "effects of psychiatric medication". Table 7.4 highlights the number of participants whose responses were coded to each of these subthemes:

Table 7.4
Number of participant responses included in "poor mental health" sub-themes.

Sub-theme	Number of participant responses	Example quotations
Psychosocial factors	9	"*…they are in an incredibly stressful point in their lives and many of them eat out of comfort…*" (occupational therapist, T8, lines 8-9, Appendix Q)
Low motivation	9	*"…there's a cohort of patients that are really demotivated stuck in quite a rut with their weight…*" (psychologist, T1, lines 73-74, Appendix J)
Effects of psychiatric medication	8	"*well probably medication is-is possibly the main factor*" (medical professional, T5, line 18, Appendix N)

7.3.4.1 Psychosocial Factors

Many patients within secure care experience low mood and staff viewed the emotional symptoms of SMI as a reason why patients engaged in binge eating:

> "*…I think people do secretly binge, I know people that I work with they will go into their room and get into the habit of watching a film and binging or they're just feeling a bit low and they binge.*" (psychologist, T1, lines 111-113)

"…*they are in an incredibly stressful point in their lives and many of them eat out of comfort…*" (occupational therapist, T8, lines 8-9)

Foods (particularly those which were high in reward) may be viewed as a source of comfort for patients during times of low mood or distress:

"… *the beige food, the canteen food, is comfort food for a lot of people…*" (occupational therapist. T8, lines 62-64)

"…*there's a lot of comfort eating, there's a lot of eating your emotions, y'know, it's what happens.*" (social worker, T9, lines 16-17, Appendix R)

Staff felt that there was a bi-directional relationship between patient's mental health and their body weight. Many acknowledge that being overweight had an impact on patient's self-esteem and that this may even impede recovery

"…*how can we expect people with really serious mental health issues to get better if they don't have a positive self-image, you know? It baffles me honestly.*" (nurse, T13, lines 25-27)

"…*you see a lot of self-harm and they take a look at themselves, and they are horrified in a day and age where, yeah you're appearance is um is everything isn't it and it does real damage.*" (nurse, T6, lines 50-52)

Patients feelings of powerlessness within treatment was also viewed as influencing their eating choices. Staff thought that patients choices of food (i.e., purchasing takeaways, snack foods in the shop) were an expression of needing to have elements of their lives that were within their control. The powerlessness that may be felt by patients is highlighted by several staff members:

> "*...and one of those is apathy and kind of a lack of control over your own uhh, yeah well over your life full stop really...*" (nurse, T6, lines 73-74),

> "…something *I hear often is staff feeling powerless and patients feeling powerless and out of control as well…*" (psychologist, T2, lines 54-55)

7.3.4.2 Low Motivation

Staff felt that many patients within their care had low motivation to maintain a healthy lifestyle

> "*…it's really hard to motive people to want to- not all patients but, but there's a cohort of patients that are really demotivated stuck in quite a rut with their weight…*" (psychologist, T1, lines 73-74)

More specifically, several quotations highlight the patients perceived lack of motivation was one of the reasons why interventions to improve weight management in the service had not been successful (e.g. physical activities groups). The following quotes highlight how staff

often viewed patients' inactive lifestyles as being a personal choice, using words that suggest that it is the individual rather than the service that is to blame for inactivity:

> "*activities and things may be available, but their mood and motivation can be a bit of a barrier.*" (psychologist, T2, lines 10-11)

> "*…we have a gym, grounds and stuff but patients don't always use the gym …. some patients have grounds leave so they can have a walk around the grounds but some of them don't even use it because they can't be bothered.*" (healthcare assistant, T11, lines 36-41)

> "*…I think, their attitudes vary. Some of them have no interest in looking after themselves umm, you know with regards to diet or smoking or exercise, they just, they don't care and they use that as a form of self-harm in a way…*" (medical professional, T12, lines 5-8)

7.3.4.3 Effects of Psychiatric Medication

Patients within this secure psychiatric service prescribed an array of medication to manage psychiatric and physical illnesses. A number of staff within the service thought that psychotropic medication was a key driver of weight gain:

> "W*ell probably medication is-is possibly the main factor…*" (medical professional, T5, line 18),

"*…if it is not just weight loss directly but high doses of medication cause sedation, apathy and other secondary factors that contribute.*" (medical professional, T5, lines 71-72)

A nurse from one of the services had strong views on the use of antipsychotic medication and how this led to an array of physical health problems for patients:

"…quickly I can see the lipid profiles going wrong, a lot more weight going on with it going up quietly, blood sugars being high .... , you'll have a little honeymoon period but there is a sea of morbidity attached to these [medication] that we will end up reaping the consequences of, and I think we are now, I think that certainly the population as a whole are much bigger now than they were back 15 years ago." (T6, lines 15-21)

7.4 Discussion

The current qualitative study aimed to explore secure psychiatric staff members' views on patient weight gain within these services. A thematic analysis of study interviews identified three themes surrounding mechanisms that contribute to poor weight management within secure psychiatric services. These include the culture within a secure psychiatric service, a culture surrounding food within the service, and poor mental health.

Staff within this service felt that mental health treatment is given a priority over physical health. This reflects concerns within the wider literature that there is a lack of physical health services operating within psychiatric inpatient facilities (Naylor et al, 2016). This lack of

resources contradicts the co-morbidity statistics for the population that clearly highlights people with SMI have poor physical health (Hennekens et al., 2005; Laursen, Munk-Olsen & Vestergaard, 2012; Subashini et al., 2011; Zareifopoulos et al., 2018; Zolezzi et al., 2017). It is unsurprising, however, that there is a lack of focused physical health resources with secure psychiatric services; as the priority of a secure service is to maintain the safety of the public and the patient (Kennedy, 2002). However, as poor physical health exacerbates mental health problems and it is prudent that services begin to adopt an integrative approach to treating patients physical and mental health needs.

Views from nursing staff within this study suggested that they had limited training to manage patients' physical health concerns. This feeling is supported by several studies conducted within other mental health service that suggest that mental health staff feel that they lack skills to manage physical health (Dickens et al., 2019; Forsyth, Elmslie & Ross, 2012; Johnson et al., 2018; Naylor et al., 2016). Dickens et al. (2019), however, propose that physical health training has been the priority for mental health policy and guidelines in recent years. It may not be an issue of lack of training or confidence for some psychiatric nurses, however, with some expressing reluctance to deal with patient's physical health problems (Dickens et al., 2019; Long et al., 2015; Prebble et al., 2011; Rylance, Chapman & Harrison, 2012). The nurses within this study identified that there was increased demands for physical healthcare with the service, but also openly revealed that they did not feel that it was "in their professional" remit to treat patient's physical health needs. This suggests that the issues experienced within this setting in part reflect staff ambivalence.

Many staff indicated the high levels of restrictions that exist within secure psychiatric services contribute to changes in patient weight; examples of common restrictions included

limited assesses to facilities to engage in physical activity, and confinement to "wards". This finding is consistent with Bacon, Farnworth and Boyd's (2012) notion that the presence of restrictions to keep a secure inpatient "safe" increases sedentary behaviour which harms physical health. Staff also highlighted that restricted access to facilities to cook foods may contribute to the maintenance of obesity in the setting. This is supported by research by Prebble et al. (2011) who identified that a lack of kitchen access, leads to patients being unable to cook healthy meals and instead creates reliance of the food provided by the hospital (or food bought from the patient shop or food bought whilst out on leave). Increased access to a kitchen could also allow patients to develop skills and knowledge around healthy eating, for example, there is opportunity for patients to engage in nutritional training with occupational therapists.

In this setting, restrictions of patients' ability to go about their day as normal, seeing family and friends, attending social events, or engaging in hobbies, recreational and/or leisure activities were viewed as contribute to weight gain. This makes sense, given that a lack of socialising can have negative impacts on mental health (Callaghan & Tottenham, 2016; Caltabiano, 1995; Weng & Chiang, 2014) and that engaging in enjoyable leisure activities promote physical health and mental wellbeing (Pressman et al., 2009).

Despite staff highlighting that restrictions were creating an environment that was obesogenic; staff felt that these were appropriate and necessary, as restrictions reflect patients risk. Staff identified that weight gain was likely when a patient was deemed too risky to be able to access leave or physical health facilities within the service, as they were confined to the ward. This is consistent with research that has found that weight gain is primarily seen when patients are first admitted into a service (Wetterling, 2006). Newly admitted patients

are not immediately permitted access to leave or facilities such as the gym as the service goes through a process of accessing their risk.

The interviews also highlighted that even when a patient had low restriction placed on their activities, staffing levels could prevent them accessing facilities. This is a core issue for staff who felt that a lack of resources mean that patients were less likely to be able to be granted opportunities for leave and thus engage in physical activity. As access to the gym and other facilities within the service are reliant on staff escort, the absence of sufficient staffing was a contributing factor to sedentary behaviour within the service. This is consistent with previous literature that highlights historical issues with low staffing levels within psychiatric and forensic services (Cormac, Ferriter & Buchan, 2013; Day & Johnson, 2017; Haw & Stubbs, 2011; Rabab et al., 2020; Rimmer, 2018).

The interviews revealed that for the culture within the secure psychiatric services was one that promoted unhealthy eating. Staff felt that within the service unhealthy foods were easier to obtain than healthy foods. This finding is supported by a review by Day & Johnson (2017) that revealed shops within secure settings sold limited fresh fruit and generally stocked packaged food items that contain additives and preservatives (Day & Johnson, 2017). Furthermore, staff felt that patients who are granted leave outside of the service had limited options in terms of purchasing healthy foods, and that nearby shops largely sold snacks and fast foods. This is consistent with literature that shows that living within food desert areas (areas that have limited access to affordable and nutritional food; Burgoine et al., 2017) is associated with greater levels of obesity compared to areas where supermarkets or shops with fresh foods are plentiful (South Wales Food Poverty Alliance, 2019).

Participants also suggested that the food provided by the service is also a likely contributor to weight gain. Staff highlighted examples of where high calorie foods are used as a mean to celebrate significant events on wards. For example, high calorie foods were also used as expression of giving thanks to staff members leaving the service. With this, patients are likely to view sharing of high calorie foods as a means of expressing positive emotions. It can be argued that this culture is positive in terms of recovery, as it helps individuals feel like they are the contributing positively to their community and exposes patients to examples of pro social behaviour. This is important as the patient groups may have experienced anti-social circumstances for much of their life prior to their admission (Booth & Stinson, 2015; Dolan & Whitworth, 2013; Dvir, Denietolis & Frazier, 2013; Heins et al., 2011; Hughes et al., 2019; Kelleher et al., 2008; Kelleher et al., 2013; Larkin & Read, 2008; Lu et al., 2008; Misiak et al., 2017; Muskett, 2014; Porter et al., 2020; Rajkumar, 2014; Schäfer & Fisher, 2011).

Staff also raised concerns about the provision of hospital food provided for patients. The services that are included in this study provide breakfast, lunch, and dinner for patients. These meals are outsourced by catering companies and serviced by housekeeping staff. Patients were provided with a weekly menu with several options to choose from for each day. However, some staff felt that the choice that patients have from menus was poor and led to patients consuming palatable snacks outside of meals times to satisfy their varying palates. This is despite published guidelines that provide clear nutritional guidance for what should be service to patients in secure care (Department of Health, 2000; Public Health England, 2021). Patients may also snack because of the timings that food is provided. For example, in the services included in this study, the last meal provided for patients is served at approximately 5pm. If breakfast is served at 8am the following morning, this means that patients are not fed

for 15 hours. It is likely that during this time, especially if they have poor sleeping patterns and are sleeping much later in the night (Cohrs, 2008; Kamphius et al., 2013; Waters, Naik & Rock, 2013), they are going to resort to snacking because they are unsatiated.

Staff described a dysfunctional dynamic within the service, where staff members do model behaviours that promote a healthy lifestyle. The consumption of unhealthy foods on the ward by some staff members may promote the idea that it is ok to eat these foods regularly. There is literature to suggest that behaviour change interventions when staff members act as positive role models for patients can improve health outcomes(Bacon, Farnworth & Boyd, 2012; Cardinal, 2001; Cormac et al., 2004; Day & Johnson, 2017; McQuaid et al., 2000). Staff members, particularly those at a ward level are likely used by patients as a benchmark of what it is to be a healthy and well-functioning human being (Nijdam-Jones et al., 2014).

Several participants in this study highlighted that there are aspects of poor mental health within secure psychiatric inpatients that may be contributing to weight gain issues. Participants named psychosocial factors, low motivation, and medication side-effects as the core contributors. This is consistent with previous literature that suggests the consequences of poor mental health has an impact on eating behaviour (Cuntz et al., 2001; Marcus et al., 1990; Riener, Schindler & Ludvik, 2006; Yanovski et al., 1993). For example, there is a large body of literature that suggest psychosocial factors such as low mood and low self-esteem can lead to comfort eating (see Chapter 2 for review). Moreover, poor motivation to engage in exercise or a healthy diet is associated with poor outcomes, particularly with regards to interventions that specifically target these activities (Burgess, Hassmén & Pumpa, 2017). There is also a wide literature base that emphasises weight issues associated with particular

medication use (see Chapter 2, section 2.5.2 for a review). It is likely that poor weight management is the result of reduced the mental health of patients in tandem with the cultures that exist within the secure psychiatric services that do not promote a healthy lifestyle.

7.4.1 Limitations and Future Research

There are several limitations identified within the current study, which relate to the methodology, as the study used a qualitative design. Much of the data included in this study is the subjective experience of staff. It is therefore difficult to generalise the current study findings to other secure psychiatric services. Having said that, much of the findings from this study were supported by previous studies conducted within psychiatric services. Furthermore, the findings in this study that were established through qualitative research methods are hypothesis generating and could lead to further research using quantitative measures associated with the themes identified in this analysis.

The sample size in the current study was small which may be considered a limitation, however literature on the appropriate sample size for qualitative research is conflicting, with some suggesting anywhere between 5 and 50 participants is an acceptable number of participants (Vasileiou et al., 2018). Vasileiou et al. (2018) suggest that 12 participants are the minimum number of participants that should be included to reach adequate data saturation. Therefore, by qualitative research standards, the current study sample size of 13 would be acceptable. However, whilst rich detail can be gathered from the 13 participants in this study, only having 13 participants' views on the study topic makes it very difficult to generalise these findings to the wider secure psychiatric staff population. Further research should look to use quantitative methodologies with large sample sizes so that objective data can be analysed and generalised to wider populations.

There may also be a risk of bias in this study sample, as participants' self-selected participation and so it may be that only those that were interested or had strong views on patient physical health agreed to take part. An additional limitation identified in the current study is the lack of patient's input used. The current study only included an analysis of staff member's views on the secure psychiatric service and patient physical health. Since the topic of interest is the patient, it may be that the inclusion of patient's views on how the service effects their physical health would add richer detail. However, patients were included within a study that paid a heavy focus on patient eating behaviour and so the researcher felt that in the interest of patient wellbeing, and relational security within their residing service, that it would not be appropriate to include them in lengthy discussions about how the service impacts their physical health. The current study was one of three conducted within quick succession within the included secure services. Future research on obesity within secure psychiatric services should not include testing patients with computer tasks and questionnaire batteries before having 20-30-minute-long discussions about their physical health.

7.5 Summary

This study explored environmental factors associated with secure psychiatric services and how they may have an impact on patient's physical health. Interviews were conducted with staff members working within secure psychiatric inpatient facilities and Thematic Analysis of the data highlighted four key themes that participants identified as possible obesogenic factors: the secure service culture, food culture, physical activity vs diet and poor mental health. The analysis also highlighted a theme which indicated initiatives that have been utilised within services and initiatives that staff members feel would be effective in promoting positive weight management in secure psychiatric inpatients.

7.6 Key findings

- Four core themes were identified that are associated with what participants felt contribute to poor physical health in secure inpatients: Secure service culture, food culture, physical activity versus diet and poor mental health. Each of these themes had a number of sub-themes.
- Staff felt that mental health was treated as a priority within the secure services, and that the restrictions experienced by patients exacerbates physical ill-health.
- Staff shortages result in a lack of opportunity to engage in physical activity.
- There was a perceived lack of accessibility to healthy foods and ease of accessibility of unhealthy foods. The choice, variety and timing of patient meals in hospital were viewed as promoting snacking behaviour
- Within these services there was a sense of normalisation of unhealthy behaviour
- Staff felt that the impact patient's poor mental health had a impact on their ability to maintain healthy body weight. Specifically the influence of psychosocial factors, poor motivation and psychotropic medication side effects have on patient weight.

Chapter 8: General Discussion

8.1 Aims of the Thesis

This thesis aimed to investigate the factors which mediate weight gain and obesity in Welsh secure psychiatric inpatients. A key objective was to report whether demographic, clinical and pharmacological characteristics of patients explain why patients in these services gain significant amounts of weight during the initial stages of treatment. A further objective was to explore the extent to which cognitive and clinical psychological factors mediated weight gain and obesity within this population. A final objective aimed to identify how the secure psychiatric environment contributed to weight gain. A full discussion of each study is provided in individual experimental chapters. In this chapter, the implications of findings and how they relate to wider issues in secure psychiatric inpatient weight gain are discussed.

8.2 Do Demographic, Clinical and Pharmacological Factors Explain Patient Weight Gain During the Initial Stages of Treatment?

The psychiatric literature pertaining to patient weight gain and obesity highlights that during the initial 12 weeks of psychiatric inpatient treatment, patient's gain excessive amounts of weight (Every-Palmer et al., 2018; Hilton et al., 2015; Wetterling, 2006). The first study in this thesis extended the current literature by exploring whether factors that are associated with weight gain in the non-secure literature (i.e., medication and clinical history), predict weight gain in a population of secure psychiatric inpatients.

Chapter 4 showed that patients gained on average 3.8kg in bodyweight over the first 12 weeks of treatment. Existing literature suggests that people lower body weight on admission

are likely to gain the most weight during treatment (Bai et al., 2009; Gentile, 2006; Hummer et al., 1995; Lau et al., 2016; Umbricht, Pollack & Kane, 1994). This was also supported by the data in this thesis. For example, Chapter 4 highlights that patient's body weight category on admission predicted the amount of weight gained over three months of treatment. Specifically, patients who were underweight on admission gained significantly more weight over the study period, compared to patients who were normal weight and overweight. However patient body weight only explained 3% of the variance in patient weight gain however, and so there are other factors at play that explain the remaining 97%.

It was anticipated that factors such as psychiatric diagnosis (Gerlach, Loeber & Herpertz, 2016; Keck & McElroy, 2003; Marder et al., 2004; Mather et al., 2008; Petry et al., 2008; Wildes, Marcus & Fagiolini 2006), history of substance misuse (Chouinard et al., 2016; Donnadieu-Rigole et al., 2016) and type of medication that patients are prescribed (Bobes et al., 2003; Covell, Weissman & Essock, 2004; Fleischhacker et al., 2009; Grootens et al., 2017; Hummer et al., 1995; Krakowski, Czobor & Citrome, 2009; Kyle & Kuehl, 2013; Leucht et al., 2007; Leucht et al., 2013; Leucht et al., 2017; Saunders et al., 2016) would also explain why the study population in Chapter 4 gained significant amounts of weight, as they are heavily implicated in weight gain in individuals with SMI. However, contrary to the wider literature, in this sample of patients none of these additional factors explained why patients gained weight. This suggests that obesity in this population is complex and not merely reflective of patients pharmacological or clinical characteristics.

8.3 Do Cognitive and Appetitive Factors Explain Weight Gain and Obesity in Secure Psychiatric Inpatients?

The findings from Chapter 4 highlight that there may be factors outside of patient pharmacology and clinical history that are contributing to the significant amounts of weight gain seen during their treatment in secure services. There is literature that proposes people with SMI have difficulties with top-down control and this can extend to eating behaviour (Cuntz et al., 2001; Marcus et al., 1990; Riener, Schindler & Ludvik, 2006; Yanovski et al., 1993). These individuals may experience difficulties in delaying gratification (Dawd, 2017) and can adopt habitual dysregulated eating behaviours that increase their risk of obesity (Afari et al., 2019; Bressile et al., 2004; Hays & Roberts, 2008; Hays et al., 2002; Lindroos et al., 1997; Provencher et al., 2003; Wilkinson et al., 2010). This is of concern for people who are treated in secure services because secure units are obesogenic (i.e. have unhealthy foods in abundance and have reduced accessibility to engage in physical activity) (Day & Johnson, 2017). There is research that highlights those who are at risk of obesity tend to be influenced by food cues in their environment. Specifically, these individuals may pay increased attention to salient food stimuli compared to neutral stimuli, otherwise known as attentional bias (Hendriske et al., 2015). Experimental studies have shown that on attentional bias tasks, overweight and obese participants process high calorie food stimuli significantly quicker than participants who are a healthy weight (Braet & Crombez, 2003; Castellanos et al., 2009; Doolan et al., 2014; Hume et al., 2015a; Hume et al., 2015b; Kemps, Tiggemann & Hollitt, 2014; Long et al., 1994; Nijs et al., 2010; Nijs et al., 2010b; Oh & Taylor et al., 2013; Schag et al., 2013; Werthmann et al., 2015). Furthermore, high attentional bias for food cues have been documented in individuals with dysregulated eating behaviour (Seage & Lee, 2017).

Chapter 5 of this thesis attempted to explore if attentional bias towards food cues, dysregulated eating behaviour scores (i.e., disinhibited eating, emotional eating and cognitive restraint) and delayed gratification scores predicted weight gain over three- and six-months periods. At baseline, the mean BMI in this sample was 36.1kg/m^2, which is within the obesity class II range. Consistent with literature pertaining to attentional bias in obese samples, patients in this study had a greater attentional bias towards food stimuli compared to neutral stimuli (Hendriske et al., 2015). Patients in this study, however, had greater indices of attentional bias than what has been documented in other obese samples (Kemps, Tiggemann & Hollitt, 2014; Loeber et al., 2012; Nijs et al., 2010a; Nijs et al., 2010b). These indices were comparable to attentional bias recorded for obese samples who were hungry when completing attentional bias tasks (Stamataki et al., 2019). This is despite the task measuring attentional bias taking place after patient's had eaten (although it is important to note that patients did report varying degrees of hunger). This study found that patients did not gain significant amounts of weight between baseline, three months, and six months post baseline. This may be because the most significant amount of weight gain is seen during the initial stages of inpatient treatment (Every-Palmer et al., 2018; Hilton et al., 2015; Wetterling, 2006), where the sample in the current study were not newly admitted inpatients.

This study also found that between baseline and three months, there was a significant association between higher scores of disinhibited and emotional eating and weight gain over three months. This is consistent with literature that suggests higher levels of these behaviours increase the risk of weight gain and obesity (Afari et al., 2019; Bressile et al., 2004; Hays & Roberts, 2008; Hays et al., 2002; Lindroos et al., 1997; Litwin et al., 2016; Lowe & Maycock, 1988; Provencher et al., 2003; Wilkinson et al., 2010). However, none of the other study variables were associated with weight gain over the study period.

8.4 Do Clinical Psychological Characteristics Explain Patient Weight Gain?

There are several complex psychological mechanisms that people with SMI experience and that have been associated with weight gain. For example, attachment style (Anderson et al., 2012; Anderson & Whitaker, 2011; D'Argenio et al., 2009; Maras et al., 2016; Nancarrow et al., 2018), ACE (Bellis et al., 2016; Felitti et al., 1998; Williamson et al., 2002) and experiential avoidance (Afari et al., 2019; Lillis, Hayes & Levin, 2011; Lillis, Levin & Hayes, 2011; Lillis et al., 2009; Lindroos et al., 1997; Schaumberg et al., 2016; Tapper et al., 2009; Wilkinson et al., 2010; Westenhoefer et al., 1994) have all been implicated in weight gain and were explored in Chapter 6. This study attempted to explore the role that deep-rooted psychological factors (that are associated with weight gain and obesity in the wider literature) have on secure inpatient weight gain and obesity maintenance. These psychological factors included attachment, ACEs and experiential avoidance.

Findings from this study highlighted that compared to other samples of adult males there were lower levels of secure attachment in the sample of secure psychiatric inpatients used in this study. Furthermore, levels of insecure attachment were higher in this study sample compared to other adult males. Patients in this study had higher levels of avoidant attachment styles compared to anxious and secure attachment styles, a finding that is consistent with other studies that utilised secure psychiatric inpatients (Timmerman & Emmelkamp, 2006). Another key finding from this study is that the mean number of ACEs in this sample was more than double of that found in other secure psychiatric samples (Booth & Stinson, 2015). Levels of experiential avoidance in the current study were comparable with other psychiatric samples and greater than samples of community adults (Gámez et al., 2014). In terms of

factors related to patient weight gain in this study, an anxious-preoccupied attachment style was positively associated with weight gain over six months. This is consistent with literature that explores the prevalence of binge eating in individuals with insecure attachment styles (Pace, Cacioppo & Schimmenti, 2012; Shakory et al., 2015).

8.5 What Do Staff Members Believe Contributes to Weight Gain and Obesity Maintenance in Patients?

Chapter 7 aimed to explore the extent to which a variety of staff members within secure psychiatric services felt that the service environment itself contributes to poor physical health in patients. Staff identified that patient mental health is treated as priority over physical health, this supports previous findings that illustrates that in psychiatric inpatient services place a low priority on physical health (Naylor et al., 2016) Staff identified that restrictions that are inherent in secure service (for patient safety) exacerbated patient weight gain as they promoted sedentary behaviours. Staff shortages also identified as impeding attempts to increase physical activity, the impact of staff shortages are unlikely to be limited to this service alone as staffing levels are low throughout psychiatric care (Cormac, Ferriter & Buchan, 2013; Day & Johnson, 2017; Haw & Stubbs, 2011; Rabab et al., 2020; Rimmer, 2018).

In this thesis, the secure setting was an environment that enabled patients to access an array of unhealthy food items. There is a literature based that proposes environments which are rich in food increase individuals motivation to overeat, and this is exacerbated in people who are vulnerable to weight gain (such as the patients treated in secure care) because they are hyper-responsive to food cues in their environment (Belfort-DeAguiar & Seo, 2019; Lowe et al., 2009; Schultes et al., 2010; Ulrich et al., 2013). This is an issue that was also

identified in the Public Health England review conducted by Day and Johnson (2017) and demonstrates that they guidance to promote physical health within SMI may not have been readily adopted. Staff in this service highlighted that the food provided by the hospital may also contribute to patient weight gain. Specific concerns were raised regarding the variety and quality of food despite their being guidance surrounding food and nutritional provision within secure services in the UK (Public Health England, 2021).

8.6 Clinical Applications

When looking at the findings of this thesis collectively, the data has presented a clear picture of how the characteristics of secure psychiatric inpatients interplay with the obesogenic psychiatric inpatient setting. The findings have illustrated that there are a number of biopsychosocial risk factors associated with obesity that are highly prevalent amongst this patient population. In particular, patients included this thesis paid greater amounts of attention to food cues (even when they were satiated), had insecure attachment styles, and reported a high number of ACEs and greater levels of experiential avoidance. Levels of experiential avoidance were higher than what is typically documented in obese adults who do not have SMI but also than populations with SMI who are treated within community settings (Gámez et al., 2014).

In this sample, high levels of dysregulated eating behaviour and anxious-preoccupied attachment style was associated with increased BMI. When individuals who have behavioural and clinical characteristics that promote obesity risk reside in an environment that is obesogenic, this is likely to further increase vulnerability to weight gain. The secure settings documented in this thesis did not prioritise physical healthcare, had high rates of sedentary behaviour and provided patients with access to an array of unhealthy foods. The obesogenic

nature of the settings is a concern given the need to provide equitable physical healthcare. The following sections explore the clinical applications of thesis in the context of secure psychiatric inpatient care.

8.6.1 Recording the weight of Secure Inpatients

The results from this thesis, as well as those from the wider literature, propose that individuals who have a lower weight on admission have an increased risk of gaining significant amounts of weight over the initial stages of inpatient treatment. This weight gain may not be clinically significant within these early stages of treatment, but weight gain trajectories can continue throughout the course of rehabilitation (Hilton et al., 2015). This finding highlights the need to closely monitor the weight of patients throughout their inpatient stay. Guidelines have been published for identifying, assessing and managing obesity (NICE, 2014b) and these have been extended for use within secure care (Public Health England, 2021). These guidelines state that weight should be measured on admission and then at regular points during treatment (at a minimum of once per month, however this can be more frequent if patients are more at risk of obesity). The secure settings recruited in this thesis had recorded patient weight at monthly intervals (for most patients) however there were inconsistencies within practice which suggests that guidelines were not always followed by all units.

8.6.2 Removing Unhealthy Foods from Display within Secure Services

Findings from this thesis also indicated that secure psychiatric inpatients have an attentional bias to food cues and have comparable scores of attentional bias to obese

individuals who are hungry (Stamataki et al., 2019), despite having eaten prior to completing an attentional bias task. This has application for changing practice within secure services because the wider literature suggests that those who have greater attentional bias towards food cues in their environment are more likely to overconsume foods (Hendriske et al., 2015). Attentional capture is most likely to lead to overeating when an environment has an abundance of palatable food stimuli, and the individuals who are hypersensitive to food cues have poor inhibitory control. Therefore, secure services should reduce the amount of high calorie food cues they have within settings (e.g. array of foods sold in patients shops) as it is likely that the pull of food cues will increase inpatients desire to consume them especially when patients are hungry.

8.6.3 Identifying Psychological Markers of Weight Gain and Obesity Risk on Admission

In this patient sample, high scores of emotional and disinhibited eating were significantly associated with weight gain over three months. This finding is consistent with the wider literature (Cuntz et al., 2001; Lazarevich et al., 2016; Litwin et al., 2017; Riener, Schindler & Ludvik, 2006; Yanovski et al., 1993). There is likely to be a high prevalence for dysregulated eating behaviours within psychiatric samples (Cuntz et al., 2001; Riener, Schindler & Ludvik, 2006; Yanovski et al., 1993). There are a number of cognitive behaviour (Moghimi, Davis & Rotondi) and mindfulness-based interventions (Daniela Mercado et al., 2021) that have shown good efficacy in reducing dysregulated eating, however, there is a significant gap in specific interventions employed within secure services to address this issue. It would be prudent for future research to explore the efficacy of psychological interventions aimed to reducing dysregulated eating behaviour within secure services specifically, given the niche nature of the environment.

Findings also showed that an anxious-preoccupied attachment style was significantly associated with weight gain over six months, and this mirrors literature that has explored attachment styles and obesity (Pace, Cacioppo & Schimmenti, 2012; Shakory et al., 2015). Secure services should assess the prevalence of these behaviours and interpersonal dynamics in patients on admission, as these psychological variables may help identify patients who will be most at risk of weight gain during treatment. Improved provision regarding access to nutrition education and interventions to promote engagement in physical activity should be implemented across services to improve the experience of those resident in secure care.

8.6.4 Promoting Integrated Health Care, Reducing Restrictions and Staff Absence in Secure Services

There are several aspects of the secure psychiatric environment which are obesogenic (Day & Johnson, 2017). This thesis highlights a need for services to place a greater emphasis on management patient's physical health need. There is a culture within secure settings that places low priority on improving patient's lifestyle. Findings also emphasised how restrictions placed on patients when they are newly admitted (and indeed throughout their stay) can promote inactivity. However, it must be acknowledged that it is inherently difficult to manage restrictions within such a setting in a way that does not increase the risk of harm to other patients, staff members, the general public or the patient themselves. Furthermore, the findings from this thesis (which are supported by the wider literature; Dickens et al., 2019; Long et al., 2015; Prebble et al., 2011; Rylance, Chapman & Harrison, 2012) indicated that some staff members do not feel that it is part of their job role to offer physical health support, particularly when patients appear to choose to act in a way that is unhealthy. Therefore, it appears that a culture shift needs to take place within the secure service work force, which

promotes physical health and well-being. However, given that this is a cultural issue, it may be difficult to achieve in a timely fashion. It is also pertinent that services explore ways to retain staff members so that patients do not suffer because of high staff turnover and absence.

8.6.5 Increase Accessibility of Healthy Foods and Physical Activity

Findings from the study in Chapter 7 suggest that there may be a lack of accessibility both to healthy food options and physical activity within secure and that patients largely appear unmotivated to maintain a healthy lifestyle. To negate this issue services need to increase opportunities to engage in health promoting activities whilst simultaneously reducing the accessibility of unhealthy foods. Recent guidelines in England were established that outline measures being taken to reduce the obesity problem within secure services (Public Health England, 2021). These guidelines state that services should follow the Hospital Food Standards (Department of Health and Social Care, 2020) for NHS patients and staff, which places a large emphasis on restricting high fat, sugar and salt foods and drinks. Furthermore, these regulations state that staff within secure services should undergo motivational and engage training to assist those patients to participate in physical activity who otherwise do not. There is little literature that documents the efficacy of such guidance given that the Public Health England report was published in February, 2021. However, there appears to be no similar guidelines for secure services within Wales. It would be prudent for Public Health Wales to establish similar guidelines for the benefit for patients and staff within Welsh secure services, all the while monitoring the efficacy of these guidelines.

8.7 Future Research

The results from studies within this thesis prompt several directions for future research. The studies included in this thesis are the first conducted within Welsh secure psychiatric services and, therefore, in the first instance future research should attempt to replicate these studies and explore if the findings are applicable to other samples of secure psychiatric inpatients. Replication of these studies should be conducted whilst considering the limitations outlined in section 8.6.

Future research should also look to include a greater number of female patients that have been included in this thesis. Female secure inpatients typically experience greater levels of morbid obesity than their male counterparts (Jonikas et al., 2015) which has significant implications for their physical health and morbidity. Researching whether the factors explored in this thesis can predict weight gain in female inpatients or identifying females who may be more at risk of weight gain upon treatment in secure services, would allow researchers to discover strategies to decrease the amount of weight gained by female inpatients. This, in turn, would lead to better physical and mental health outcomes.

The findings from work package 2 indicate that in this sample of secure inpatients, emotional eating, uncontrolled eating, and an anxious-preoccupied attachment style were associated with weight difference. Future research should look to explore if these factors can be used to statistically model weight gain in secure inpatients, as this was not possible in the current study due to the small number of participants. Understanding whether these factors are predictive of weight gain, particularly over the initial stages of treatment, could lead to the development of screening measures so assess new patients' risk of weight gain. This

would mean that multidisciplinary teams would be aware of those patients who are most at risk of weight gain and implement measures to ensure that those patients do not gain excessive, health-harming amounts of weight.

8.8 Limitations

Several limitations must be considered when interpreting the thesis findings. Specific limitations have been discussed in relevant empirical chapters however, the more general limitations of the thesis also need to be discussed.

8.8.1 Representation

Demographic characteristics of all patient participants included were homogenous as most were male. Additionally, the sample recruited from secure psychiatric services in Wales and therefore most inpatients were Welsh and Caucasian. As a result, the extent to which the results and conclusions from this thesis can be directly generalised to secure inpatients outside of the Welsh population, as well as wider ethnic groups, is limited. This is because cultural factors may differ between Welsh individuals and patients from other areas of the UK such as England. Welsh and English secure services are also regulated by different bodies and so different procedures may be in place in England that may affect patient weight gain differently to Welsh patients. For this reason, it is plausible that if the studies conducted in this thesis were conducted with secure inpatients within other services outside of Wales, results may not be directly comparable with this Welsh sample.

8.8.2 Methodological Issues

The studies included in this thesis had some limitations associated with the methodology and data analysis that were used. For example, Chapter 4 included a study that involved use of retrospective data collected from patient medical records. As a result of this, the validity of these data are dependent on the accuracy of the information recorded by staff members. Furthermore, as the data in this study was collected over a six-year period, it is plausible that the methods used for recording patient information were changed to be more efficient. For example, a large proportion of earlier patient medical records in this study were electronically recorded or scanned onto the secure network drive for ease of access by staff members. The inconsistent nature of data recording may have led to the varying degrees of detail that were included in these records and may explain why height was not consistently collected for patients throughout their admission. As a result of this, BMI was not able to be calculated for the first study. Whilst the first study did not include details of patient BMI, it did collect weight data over the initial stages of admission. As previously stated, this is the riskiest time for patient weight gain during their treatment in secure hospital. However, the studies included in Chapters 5 and 6 did not collect weight data over the course of admission. This may explain why the levels of weight gain seen in patients (as measured by BMI difference) was not significant.

A further methodological limitation in this thesis relates to sample sizing. The studies included in Chapters 4 and 5 included a small number of patients (n = 23). These studies also attempted to explore the predictive power of a range of psychological phenomena and so the small number of patients significantly reduced the power of regression analyses. As a result, these studies had to rely on non-parametric methods of analysis and did not provide an

insightful or clinically applicable findings as was aimed for prior to data collection. Another limitation from these studies includes the largely male sample. This is particularly an issue because the psychiatric obesity literature tends to suggest that female inpatients experience greater levels of weight gain and higher prevalence rates of obesity.

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Appendices

Appendix A

NHS Wales definitions of research

Research	Service evaluation	Clinical audit
The attempt to derive generalisable new knowledge including studies that aim to generate hypotheses as well as studies that aim to test them.	Designed and conducted solely to define or judge current care.	Designed and conducted to produce information to inform delivery of best care.
Quantitative research – designed to test a hypothesis. Qualitative research – identifies/explores themes following established methodology.	Designed to answer: "What standard does this service achieve?"	Designed to answer: "Does this service reach a predetermined standard?"
Addresses clearly defined questions, aims and objectives.	Measures current service without reference to a standard.	Measures against a standard.
Quantitative research – may involve evaluation or comparing interventions, particularly new ones. Qualitative research – usually involves studying how interventions and relationships are experienced.	Involves an intervention in use only. The choice of treatment is that of the clinician and patient according to guidance, professional standards and/or patient preference.	Involves an intervention in use only. The choice of treatment is that of the clinician and patient according to guidance, professional standards and/or patient preference.
Usually involves collecting data that are additional to those for routine care but may include data collected routinely. May involve treatments, samples or investigations additional to routine care.	Usually involves analysis of existing data but may include administration of interview or questionnaire.	Usually involves analysis of existing data but may include administration of simple interview or questionnaire.
Quantitative research – study design may involve allocating patients to intervention groups. Qualitative research – uses a clearly defined sampling framework underpinned by conceptual or theoretical justifications.	No allocation to intervention: the health professional and patient have chosen intervention before service evaluation.	No allocation to intervention: the health professional and patient have chosen intervention before audit.
May involve randomisation.	No randomisation.	No randomisation.

Normally requires REC review. Refer to www.nres.npsa.nhs.uk/applications/apply/ for more information.	Does not require REC review.	Does not require REC review.

Note. Adapted from: http://www.wales.nhs.uk/sites3/documents/952/res_defining_research_sept_2013.pdf

Appendix B

Letter to Responsible Clinician

Dear (name)

Re: <u>Weight gain in secure psychiatric settings: The role of psychological factors in the mediation of obesity in secure services.</u>

It was good to talk to you and know that you have a service user who is potentially appropriate for inclusion in the above study. I look forward to receiving confirmation about whether the clinical team have agreed that the service user can be approached to receive information about the study.

You have received the study protocol, including details of the recruitment process, inclusion/exclusion criteria and time scale of the study for your information.

I have also sent all documentation relevant to informing the potential study participant about the study and guidance for staff. Please give this information to the liaison clinician you identify who will make the initial approach to the service user.

A duplicate set of papers is enclosed. Please forward this to the participants GP.

Please do not hesitate to contact me should you require any further information and thank you again for your support for this study.

Yours sincerely

Joseph Davies
PhD Student
Joseph.davies@wales.nhs.uk

Appendix C

PARTICIPANT INFORMATION

PART ONE

Weight gain in secure psychiatric settings: The role of psychological factors in the mediation of obesity in secure services.

A research study conducted by
Joseph Davies

You are being invited to take part in a research study. Before you decide if you would like to take part, it is important for you to understand why the research is being done and what it will involve.

Please take time to read this leaflet carefully.

1. What is the purpose of the study?

The purpose of this study is to understand why some people gain weight in secure hospitals. This could help to improve the way we help people to avoid gaining weight in hospital.

In particular, the aim is to understand:

- Why some people gain weight and others do not.
- How people's thoughts and reactions affect their weight gain.
- To see how your weight has changed since admission and what medication you take.

This study will involve completing one task and several questionnaires. We will also look at your mental health care records. The results will form part of a final PhD research report.

2. Why have I been chosen?

We have not been given your name, but we have spoken with your clinical team who have suggested that you can receive information and an invitation to participate in this study.

3. Do I have to take part? Can I withdraw if I decide to take part?

No. Participation is completely voluntary. Your decision will have no impact on any treatment you receive from your clinical team. You may withdraw from the study at **any time without reason**. Doing so will not have any impact on your ongoing care and treatment.

4. **What will happen to me if I agree to take part?**

I will meet you and talk to you about the study. If you still want to take part after we have met, you will complete 1 computer task and 8 questionnaires. Your weight will also be recorded at the beginning of the study process and between 3 and 6 months later. These data may be obtained from your clinical records. This can be done over a few weeks if necessary. We will take certain information from your health-care records if you consent, such as; date of birth, medication, diagnosis, weight and height.

- If you are interested in participating in the study, then please let your clinical team member know and they will tell me your name and I will come and meet you.
- On each day of participation, we will check again that you understand the study and are happy to take part. You can still withdraw at this point.
- If you need help to complete the questionnaires, the researcher can read questions aloud to you and you can answer them verbally.
- Participation will be held in a private room in the place you normally attend for appointments.
- Sessions will take no longer than 60 minutes.

You can refuse to answer any of the particular questions asked or you can say as much or as little as you want to. You can end your participation at any time and you can take breaks if you need to.

5. **What happens after participation?**

Your responses will be inputted into a computer software used to conduct analysis. Any personal information that could identify you or the unit will be removed. We will be analysing all the responses from you and other participants. We will be writing up the study as a journal article, which may be submitted to an academic journal to be published.

We can send you a report of our findings at the end of the study if you would like it.

6. **What if I lose capacity during the study process?**

We recognise that people may have fluctuating levels of capacity. If your capacity is lost after you have participated in either part or all of the study, we will withdraw you from the remainder of the study until you have regained capacity. If you agree to take part in the study, all data collected prior to your loss of capacity will be kept by the research team and included in the study analysis.

7. **Will my responses go on my record or be shared with my clinical team?**

Your responses will not form part of your clinical record and will not be shared with the clinical team. However, a record of an invitation to take part and a note that you have participated will be recorded in your healthcare record. However, if we have reason to believe that you, or someone else, are at risk of harm, or if you tell us about a criminal act that you have not previously disclosed, we may need to inform a member of the clinical team, but we will tell you if we intend to do so.

8. The study sponsor

Cardiff Metropolitan University is the sponsor for this study based in the United Kingdom. We will be using information from you and your medical records in order to undertake this study and will act as the data controller for this study. This means that we are responsible for looking after your information and using it properly. Cardiff Metropolitan University will keep identifiable information about you until the analysis has be conducted.

Your rights to access, change or move your information are limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. If you withdraw from the study, we will keep the information about you that we have already obtained. To safeguard your rights, we will use the minimum personally-identifiable information possible.

You can find out more about how we use your information by contacting the principal investigator, Joseph Davies. Contact information is given below.

9. Personal data

The Caswell Clinic will collect information from you and your medical records for this research study in accordance with our instructions.

The Caswell Clinic will keep your name, NHS number and contact details confidential and will not pass this information to Cardiff Metropolitan University. The Caswell Clinic will use this information as needed, to contact you about the research study, and make sure that relevant information about the study is recorded for your care, and to oversee the quality of the study. Certain individuals from Cardiff Metropolitan University (i.e. the principal investigator) and regulatory organisations may look at your medical and research records to check the accuracy of the research study. Cardiff Metropolitan University will only receive information without any identifying information. The people who analyse the information will not be able to identify you and will not be able to find out your name, NHS number or contact details.

The Caswell Clinic will keep identifiable information about you from this study until after the analysis has been conducted.

10. Are there possible disadvantages/risks in taking part?

There are no foreseeable risks of taking part in the study. However, if you feel upset or distressed at any point tell the researcher immediately. Participation can then be stopped, and a member of your team will be available to provide you with support.

11. What are the possible benefits of taking part?

The results of the study may increase understanding of why some people gain weight in secure hospitals and why some people do not which may improve the help that other people receive in the future and help improve the care and support of physical health and wellbeing in future.

12. Who approved this study?

This research has been proved by:

- ABMU research and development
- Cardiff Metropolitan University
- Wales Local Research Ethics Committee 2

13. What if there is a problem?

Any complaint about the study would be taken very seriously. Part 2 of the Participant Information leaflet contains details of the complaint's procedure.

Thank you for reading this leaflet. If you are interested in taking part in the study, please see Part 2 of the Participant Information for further details of the complaints and confidentiality procedures.

If you would like to discuss taking part in this research study, then you can contact us.
Contact details:

Joseph Davies
Principal Investigator/
PhD Student
Caswell Clinic
Tondu Road
Bridgend
CF31 4LN
Tel: 01656 662179

Dr Ruth Bagshaw
Consultant Psychologist
Caswell Clinic
Tondu Road
Bridgend
CF31 4LN
Tel: 01656 753025

PARTICIPANT INFORMATION

PART TWO

Weight gain in secure psychiatric settings: The role of psychological factors in the mediation of obesity in secure services.

A research study conducted by
Joseph Davies

This leaflet provides further information about the study's complaints and confidentiality procedures. It should be read following the leaflet entitled:

Participant Information Part One

1. **What if there is a problem?**

When we arrange your participation in the study, we will also arrange for a member of your clinical team to be available to you after each session. This will mean that if you will have someone familiar to talk to if you need it.

Any concerns about the way you have been dealt with during the study will be treated very seriously.

2. **Raising a concern:**

If you have a concern about any aspect of this study, please address them to us (details overleaf) and we will do our best to answer them. If you are still unhappy and wish to raise a concern formally, or you want to complain about something we have done or said, you can do any of the following.

- Tell the staff member who initially approached you about participating in the study. He/she will support you in finding out about the NHS concerns procedure.

- Directly contact:

Tracey Myhill
Chief Executive
Abertawe Bro Morgannwg University Health Board
Headquarters
One Talbot Gate
Baglan Energy Park
Port Talbot
SA12 7BR

Telephone: 01639 683319
Email: abm.complaints@wales.nhs.uk

A copy of the complaint's procedure leaflet can be given to you on request.

3. Will my taking part in this study be kept confidential?

All your information will be treated as confidential.

As outlined in the first information leaflet, the responses you give will not form part of your clinical record and will not be shared with the clinical team.

Your clinical team will be aware that you are participating in the study and your GP will be also be informed. We will send information about the study to them.

The exceptions to this are if we believe that you, or someone else, are at risk of harm, or if you tell us about a criminal act that you have not previously disclosed to the clinical team. In these cases, we may need to inform a member of the clinical team, but we will tell you if we intend to do so.

Any personal information that could identify you will be removed from the study report. The data will be stored securely while the study is written up. After the study is completed and the PhD theses have been examined, the data will be stored securely for 10 years within ABMU Health Board.

The data will be analysed by the researchers together with data from other participants responses.

When we have finished the study, we can send you a summary of our findings if you would like. We will send this to your Responsible Clinician who can forward it to you.

The procedures for handling, processing, storage and destruction of your data will comply with the Data Protection Act 1998, a copy of which is available to you if you so wish.

4. What will happen to the results of the research study?

It is intended that the research be published. You will not be identified in any publication. A summary of the findings will be sent to you unless you would prefer not to receive it.

The findings will also be presented to professionals working within forensic mental health services to help improve the quality of care of inpatients.

5. Who is organising and funding the research?

The research is funded by the Knowledge Economy Skills Scholarship (KESS II).

Neither the unit, CMHT or clinician responsible for your care will receive any payment for your participation in the study.

6. Who has reviewed the research?

This research has been proved by:

- ABMU research and development
- Cardiff Metropolitan University
- Wales Local Research Ethics Committee 2

Thank you very much for taking the time to read these information leaflets. Please keep them for your own records.

Contact details:

Joseph Davies PhD Student School of Applied Psychology Cardiff Metropolitan University CF5 2YB	Dr Ruth Bagshaw Consultant Psychologist Caswell Clinic Tondu Road Bridgend CF31 4LN

Appendix D

Participant introduction letter

School of Applied Psychology
Cardiff Metropolitan University
200 Western Avenue
Llandaff
Cardiff
CF5 2YB
Tel: (02920) 416070

South Wales Forensic Mental Health Service
Caswell Clinic
Tondu Road
Bridgend
CF31 4LN

Tel:(01656) 662179

22/11/2018

Dear service user, re: participation in a study on "Weight gain in secure psychiatric settings".

Thank you for taking the time to read this letter. To introduce myself, I am a post graduate psychology student studying a PhD degree at Cardiff Metropolitan University and I have an honorary contract with ABMU Health Board as a research student. I am conducting a study using a number of different tests and questionnaires in order to learn more about why some people gain weight in the clinic and why some people do not. The study is supervised by Dr Paul Hewlett from Cardiff Metropolitan University, and Dr Ruth Bagshaw from ABMU Health Board.

More detailed information is available in the attached Information Leaflet Part (1) and your clinical team member can answer any questions you might have about the study.

I do not know your identity. Your clinical team has agreed to approach you on my behalf and invite you to take part in the study. For now, please allow me to give you some information about the study and why I would like to invite you to take part. There are some good reasons why such a study is needed. The reasons include:

Developing an understanding why people gain weight and why people do not when in a secure hospital.

It is not known exactly why people who are in secure hospitals, who also take antipsychotic medication, gain more weight than others. This study aims to find out what psychological factors play a part in this weight gain. Findings from this study could help the clinical team, and the health board as a whole, to understand what things might make a person gain weight, so that they can put plans in place to stop people gaining excessive amounts of weight and reduce the negatives that come with excessive weight gain.

Invitation to participate in the study

If you are interested in participating in the study, then please read the Information Leaflet Part (1). Further information is available in Information Leaflet Part (2) which you can read if you think you would like to participate in the study. If you agree to participate, I will meet with you, at a time and date convenient to you, within the next two weeks so that with your consent I can begin the study with you.

Important points

It is important that you understand that:

- Participation is completely voluntary. Agreeing or refusing to take part in the study will have no bearing whatsoever on your treatment or any decisions made about your mental health care.

- At this point, individuals are not required to make a final decision about participation in the study. If you agree to meet with me, you can still decline to proceed any further.

I hope that this letter has been helpful in introducing myself and giving you some brief details about the study. Please ask your staff member if you require any further information.

Yours Sincerely,

Joseph Davies
PhD Student

Further information is available from:

Dr Ruth Bagshaw
Chief Investigator

South Wales Forensic Mental Health Service
Caswell Clinic
Tondu Road
Bridgend
CF31 4LN

Tel:(01656) 662179

Dr Paul Hewlett
Academic Supervisor

School of Applied Psychology
Cardiff Metropolitan University
200 Western Avenue
Llandaff
Cardiff
CF5 2YB
Tel: 02920 416070

Appendix E

Participant consent form

Consent Form

Title of Project: Weight gain in secure psychiatric settings: The role of psychological factors in the mediation of obesity in secure services.

Name of Researcher: Joseph Davies

PLEASE SIGN INITIALS IN BOX

1. I confirm that I have read and understood the Information Leaflets Parts 1 & 2 (date: 12/10/2018, version number 1.3) for the above study. I have had the opportunity to consider the information, ask questions and have these answered to my satisfaction. ☐
2. I understand that if I lose capacity during the study process, that data collected from my participation whilst having capacity will be retained. ☐
3. I understand that my weight and other personal information will be taken from my healthcare records ☐
4. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my treatment or other legal rights being affected. ☐
5. I understand that only the research team will have access to any personally identifiable information. ☐
6. I understand that my responses in tasks used within the above study will be anonymised and any published work will not include personally identifiable information. ☐
7. I agree to take part in the above study. ☐
8. I agree to my clinical team and GP being informed about my participation in this study. ☐

_____ _____ _____

Name of service user Date Signature

_____ _____ _____

Researcher Date Signature

Appendix F

Joseph Davies study 2 – Questionnaire Pack

Includes:

-Brief Experiential Avoidance Questionnaire (15-items)
-Three Factor Eating Questionnaire Revised-18 (18-items)
-Relationship Questionnaire (4-items)
-Delayed Gratification Scale (35-items)
-MoCA
-The ACE Tool (10-items)

Date: Participant study number:

Age of participant: Sex of participant: M/F

Weight of participant: Weight after 6 months:

Height of participant:

Antipsychotic medication/dose: _____

_____

Other medication/dose: _____
_____
_____
_____

Mood Questionnaire

Please place a mark through each of the following lines indicating how you are feeling at the moment. For example:

How tired do you feel?

not at all _____|_____ extremely

How hungry do you feel?

not at all _____ extremely

How thirsty do you feel?

not at all _____ extremely

How happy do you feel?

not at all _____ extremely

How energetic do you feel?

not at all _____ extremely
strong strong
strong strong

Brief Experiential Avoidance Questionnaire – BEAQ

Please indicate the extent to which you agree with each of the following statements

	Strongly D/agree	**Moderately D/agree**	**Slightly D/agree**	**Slightly Agree**	**Moderately Agree**	**Strongly Agree**
1. The key to a good life is never feeling pain						
2. I'm quick to leave any situation that makes me feel uneasy						
3. When unpleasant memories come to me, I try to put them out of my mind						
4. I feel disconnected from my emotions						
5. I won't do something until I absolutely have to						
6. Fear of anxiety won't stop me from doing something important						
7. I would give up a lot not to feel bad						
8. I rarely do something if there is a chance that it will upset me						
9. It's hard for me to know what I'm feeling						

9. It's hard for me to know what I'm feeling						
	Strongly D/agree	**Moderately D/agree**	**Slightly D/agree**	**Slightly Agree**	**Moderately Agree**	**Strongly Agree**
10. I try to put off unpleasant tasks for as long as possible						
11. I go out of my way to avoid uncomfortable situations						
12. One of my big goals is to be free from painful emotions						
13. I work hard to keep out upsetting feelings						
14. If I have any doubts about doing something, I just won't do it						
15. Pain always leads to suffering						

The Three-Factor Eating Questionnaire

Please read each statement and select from the multiple choice options the answer that indicates the frequency with which you find yourself feeling or experiencing what is being described in the statements below.

	Definitely False	**Mostly False**	**Mostly True**	**Definitely True**
1. When I smell a delicious food, I find it very difficult to keep from eating, even if I have just finished a meal.				
2. I deliberately take small helpings as a means of controlling my weight.				
3. When I feel anxious, I find myself eating.				
4. Sometimes when I start eating, I just can't seem to stop.				
5. Being with someone who is eating often makes me hungry enough to eat also.				
6. When I feel blue, I often overeat.				
7. When I see a real delicacy, I often get so hungry that I have to eat right away.				
8. I get so hungry that my stomach often seems like a bottomless pit.				
9. I am always hungry so it is hard for me to stop eating before I finish the food on my plate.				
10. When I feel lonely, I console myself by eating.				

	Definitely False	Mostly False	Mostly True	Definitely True
11. I consciously hold back at meals in order not to weight gain.				
12. I do not eat some foods because they make me fat.				
13. I am always hungry enough to eat at any time.				
	Only at meal times	**Sometimes between meals**	**Often between meals**	**Almost always**
14. How often do you feel hungry?				
	Almost never	**Seldom**	**Moderately likely**	**Almost always**
15. How frequently do you avoid "stocking up" on tempting foods?				
	Unlikely	**Slightly likely**	**Moderately likely**	**Very likely**
16. How likely are you to consciously eat less than you want?				
	Never	**Rarely**	**Sometimes**	**At least once a week**
17. Do you go on eating binges though you are not hungry?				

18. On a scale of 1 to 8, where 1 means no restraint in eating and 8 means total restraint, what number would you give yourself (please circle)

1 2 3 4 5 6 7 8

Relationship Questionnaire

Following are four general relationship styles that people often report. Place a checkmark next to the letter corresponding to the style that best describes you or is closest to the way you are.

____ A. It is easy for me to become emotionally close to others. I am comfortable depending on them and having them depend on me. I don't worry about being alone or having others not accept me.

____ B. I am uncomfortable getting close to others. I want emotionally close relationships, but I find it difficult to trust others completely, or to depend on them. I worry that I will be hurt if I allow myself to become too close to others.

____ C. I want to be completely emotionally intimate with others, but I often find that others are reluctant to get as close as I would like. I am uncomfortable being without close relationships, but I sometimes worry that others don't value me as much as I value them.

____ D. I am comfortable without close emotional relationships. It is very important to me to feel independent and self-sufficient, and I prefer not to depend on others or have others depend on me.

Now please rate each of the relationship styles above to indicate how well or poorly each description corresponds to your general relationship style.

Style A

1(Disagree Strongly). 2. 3 4(neutral/mixed) 5 6 7 (Agree strongly)

Style B

1(Disagree Strongly). 2. 3 4(neutral/mixed) 5 6 7 (Agree strongly)

Style C

1(Disagree Strongly). 2. 3 4(neutral/mixed) 5 6 7 (Agree strongly)

Style D

1(Disagree Strongly). 2. 3 4(neutral/mixed) 5 6 7 (Agree strongly)

Delayed Gratification Scale

Answer Each Item

For each statement indicate to what extent you strongly agree (SA) or strongly disagree (SD).

	SA				SD
1. I often research my choices before making large purchases.	☐	☐	☐	☐	☐
2. If the is a movie/album/book that I want, I typically buy it the first day it's available	☐	☐	☐	☐	☐
3. I am good at keeping secrets	☐	☐	☐	☐	☐
4. I would rather plan social events in advance than wait until the last minute.	☐	☐	☐	☐	☐
5. I don't mind letting people go ahead of me in line.	☐	☐	☐	☐	☐
6. I try to complete homework assignments before socializing on the weekend.	☐	☐	☐	☐	☐
7. I could say my motto is, "Why do today what I can put off until tomorrow?"	☐	☐	☐	☐	☐
8. Sometimes I like to eat dessert before my meal	☐	☐	☐	☐	☐
9. When playing board games, I would prefer to take my turn last	☐	☐	☐	☐	☐
10. I like to get all of my work done before I go out and have fun.	☐	☐	☐	☐	☐
11. When I rent two movies, I watch the one I think I'll like best first.	☐	☐	☐	☐	☐
12. After typing a paper, I always check for "typos."	☐	☐	☐	☐	☐
13. I would wait to make a purchase if I knew the item would go on sale in a month	☐	☐	☐	☐	☐
14. If I win the lottery and have a choice to either take a lump sum of 100,000 dollars instantly or receive 2,500 dollars per month for 5 years totaling 150,000 dollars, I would take the instant lump sum.	☐	☐	☐	☐	☐
15. If I know someone has a gift for me I usually am very tempted to sneak a peek before they actually give it to me.	☐	☐	☐	☐	☐
16. I would never wait in a line more than half an hour to see a band play even if it is a band I enjoy.	☐	☐	☐	☐	☐

	SA				SD
17. If I were to drink alcohol, I would only do so on the weekends.	☐	☐	☐	☐	☐
18. I see something I want I don't wait, I buy it on the spot.	☐	☐	☐	☐	☐
19. If I'm hungry, I'll grab a snack even if it's right before a meal.	☐	☐	☐	☐	☐

20. When I am excited for the next day, I go to sleep early to make it come sooner.	☐	☐	☐	☐	☐
21. I do not charge anything unless I have the money to pay for it.	☐	☐	☐	☐	☐
22. I am typically patient in traffic	☐	☐	☐	☐	☐
23. I can't get it right the first time, I stop trying	☐	☐	☐	☐	☐
24. I don't read the back of books because they ruin the story	☐	☐	☐	☐	☐
25. I have discipline.	☐	☐	☐	☐	☐
26. I am willing to forgo a second dessert or helping of my favorite food when offered.	☐	☐	☐	☐	☐
27. I feel satisfaction from working hard to achieve my goals.	☐	☐	☐	☐	☐
28. I follow a schedule	☐	☐	☐	☐	☐
29. I believe that good things come to those who wait.	☐	☐	☐	☐	☐
30. In order to feel happy, I have to have what I want when I want it.	☐	☐	☐	☐	☐
31. When I go to a party with friends, I never take my turn as the designated driver.	☐	☐	☐	☐	☐
32. When I go grocery shopping, I make a list a follow it.	☐	☐	☐	☐	☐
33. When I am really interested in a topic, I will go out of my way to find out additional information even if it is difficult to find.	☐	☐	☐	☐	☐
34. My motto is "work now, play later."	☐	☐	☐	☐	☐
35. I reward myself only when I accomplish my tasks fully.	☐	☐	☐	☐	☐

The Ace Tool

Please indicate whether any of the following events occurred prior to your 18th birthday by circling **YES** or **NO**.

Did a parent or other adult in the household often or very often…	
1. Swear at you, insult you, put you down, or humiliate you? or Act in a way that made you afraid that you might be physically hurt?	**YES** / **NO**
2. Push, grab, slap, or throw something at you? or Ever hit you so hard that you had marks or were injured?	**YES** / **NO**
Did an adult or person at least 5 years older than you ever…	
3. Touch or fondle you or have you touch their body in a sexual way? or Attempt or actually have oral, anal, or vaginal intercourse with you?	**YES** / **NO**
Did you often or very often feel that …	
4. No one in your family loved you or thought you were important or special? or Your family didn't look out for each other, feel close to each other, or support each other?	**YES** / **NO**
5. You didn't have enough to eat, had to wear dirty clothes, and had no one to protect you? or Your parents were too drunk or high to take care of you or take you to the doctor if you needed it?	**YES** / **NO**
6. Were your parents ever separated or divorced?	**YES** / **NO**
Was your mother or stepmother:	
7. Often or very often pushed, grabbed, slapped, or had something thrown at her? or Sometimes, often, or very often kicked, bitten, hit with a fist, or hit with something hard? or Ever repeatedly hit over at least a few minutes or threatened with a gun or knife?	**YES** / **NO**

8. Did you live with anyone who was a problem drinker or alcoholic, or who used street drugs?	**YES** / **NO**
9. Was a household member depressed or mentally ill, or did a household member attempt suicide?	**YES** / **NO**
10. Did a household member go to prison?	**YES** / **NO**

Appendix G

Interview schedule

1. What are your thoughts on patient's physical health in general within the service?

2. What did you notice about patient's weight upon admission?

3. What factors may be influencing patient's physical health whilst they are in hospital?

4. How healthy are the food choices for patients within the service?

5. Do you know of any initiatives that have been implemented to tackle physical health issues?

6. Is there anything you think that the service should be doing more or less of to negate physical health issues?

7. If you had a magic wand, us there would thing you would change, specifically, to tackle physical health issues within the service?

Appendix H

Work package 2, study 2 regression analyses

Predicting BMI difference over three months (n = 23)

Analysis predictor variables: Attentional bias towards food cues, uncontrolled eating score (TFEQ-18-U), cognitive restraint (TFEQ-18-R), emotional eating (TFEQ-18-E), and delayed gratification of food (DGI-35-F).

Analysis dependent variable: BMI difference over three months

This model was not significant predictor of change in BMI (F (5, 18) = .722, p = .615, adj. R^2 = -.064).

Multiple regression results for BMI difference over three months

BMI difference (kg/m^2)	*B*	95% CI for *B*		*t*	*SE B*	β
		LL	UL			
Constant	-.607	-5.425	4.200	-.265	2.288	
Attentional bias	-.004	-.014	.007	-.753	.005	-.176
TFEQ-18-U	.102	-.109	.313	1.019	.100	.440
TFEQ-18-R	-.088	-.339	.163	-.735	.119	-.192
TFEQ-18-E	-.025	-.469	.420	-.117	.211	-.047
DGI-35-F	.010	-.125	.144	.149	.064	.033

Note. Model = "Backward" method in SPSS statistics; *B* = unstandardized regression coefficient; CI = confidence interval; *LL* = lower limit; *UL* = upper limit; *t* = *t* value; *SE B* = standard error of the coefficient; *B* = standardised coefficient.

Predicting BMI difference over six months (n = 21)

This model was not significant predictor of change in BMI (F (5, 16) = 1.136, p = .382, adj. R^2 = .031).

Multiple regression results for BMI difference over six months

BMI difference (kg/m^2)	*B*	95% CI for *B*		*t*	*SE B*	β
		LL	UL			
Constant	-.085	-6.629	6.459	-.028	3.087	
Attentional bias	-.003	-.016	.011	-.434	.006	-.102
TFEQ-18-U	.120	-.185	.425	.833	.144	.378
TFEQ-18-R	-.246	-.666	.174	-1.240	.198	-.384
TFEQ-18-E	.216	-.358	.790	.797	.271	.304
DGI-35-F	.019	-.159	.197	.228	.084	.050

Note. Model = "Backward" method in SPSS statistics; *B* = unstandardized regression coefficient; CI = confidence interval; *LL* = lower limit; *UL* = upper limit; *t* = *t* value; *SE B* = standard error of the coefficient; *B* = standardised coefficient.

Appendix I

Work package 2, study 3 regression analyses

Predicting BMI difference over three months (n = 23)

Analysis predictor variables: Scores of dismissive attachment (A), preoccupied attachment (C), fearful attachment (D), number of ACEs, and scores of experiential avoidance (BEAQ).

Analysis dependent variable: BMI difference over three months

This model was not significant predictor of change in BMI (F (6, 17) = .856, p = .546, adj. R^2 = -.039).

Multiple regression results for BMI difference over three months

BMI difference (kg/m^2)	*B*	95% CI for *B*		*t*	*SE B*	β
		LL	UL			
Constant	.302	-5.886	6.490	.103	2.933	
B	0.48	-.483	.578	.190	.251	.048
C	.386	-.118	.890	1.616	.239	.437
D	-.324	-1.057	.408	-.934	.347	-.303
Number of ACEs	.068	-.218	.354	.499	.136	.122
Total BEAQ	.029	-.031	.089	1.016	.028	.264

Note. Model = "Backward" method in SPSS statistics; *B* = unstandardized regression coefficient; CI = confidence interval; *LL* = lower limit; *UL* = upper limit; *t* = *t* value; *SE B* = standard error of the coefficient; *B* = standardised coefficient.

Predicting BMI difference over six months (n = 21)

This model was a significant predictor of 41% of the variance in BMI change (F (6, 15) = 3.414, p = .025, adj. R^2 = .408).

Multiple regression results for BMI difference over six months

BMI difference (kg/m^2)	*B*	95% CI for *B*		*t*	*SE B*	β
		LL	UL			
Constant	1.028	-5.369	7.424	.342	3.001	
B	.180	-.377	.737	.689	.261	.140
C	.946	.431	1.462	3.912	.242	.834
D	-.829	-1.583	-.075	-2.342	.354	-.592
Number of ACEs	.279	-.013	.571	2.033	.137	.389
Total BEAQ	.031	-.032	.094	1.057	.029	.218

Note. Model = "Backward" method in SPSS statistics; *B* = unstandardized regression coefficient; CI = confidence interval; *LL* = lower limit; *UL* = upper limit; *t* = *t* value; *SE B* = standard error of the coefficient; *B* = standardised coefficient.

Appendix J

Study 3 Transcript 1

I: First of all, what would you say your thoughts are on patient's physical health in general in [service name removed]?

P1: Uhm, I would say it is pretty poor in terms of metabolic syndrome, diabetes... just lack of movement, weight gain, breathing problems, sleep apnoea, just the effects of medication obviously can knock years off someone's life but not for everyone, which is what I guess your research is around umm, but just how its quite incredible how you can see someone just pile on the pounds so quickly umm from maybe slightly overweight to morbidly obese in quite a short amount of time

I: Yeah. Did you notice, have you noticed people who have come into the clinic that they gain weight really quickly when they come in?

P1: yes, yes umm, yes definitely. And I think that's… my – this isn't scientific – but my, my ideas around that are how sedentary their lifestyle is.

I: When they come in.

P1: Yeah, boredom, binging on copious amounts of sugary foods, drinks, drinks in particular y'know full fat bottles, you see people come in with what's that, the 2 litre bottles of umm pop, just not moving really y'know. Some people are confined really to the ward environment for a while and they may not move further than their bedroom to communal areas

I: is that because the clinical team are working out their…

P1: Umm yeah I mean its all dependent upon risk so it doesn't necessarily, so some people may come and be granted astro-turf straight away umm but particularly admissions to [ward name removed] who are particularly unsettled umm

I: they get less freedoms straight off the bat kind of?

P1: Yeah, yeah…

I: Are there any specific factors that you think, that when they come into the clinic that may be influencing poor physical health?

P1: I think may be people who have come from a prison environment have umm, and this was kind of discussed in I think a forum the other day that, I think that there's difficult cultures, I think that there's a lot more emphasis on working out and kind of being quite muscley, umm you know people umm they obviously have the prison food and the shop but not to the extent of people going out really and bringing bags and bags full of just high calorie foods in and I get the sense that people wanna be quite buff really in prison, but the culture here is quite different for many people, not all but still have a real emphasis on being strong but I think the, it's almost normalised and I've heard a few people say well I'm not as big as him so umm, their bench mark for kind of normality and healthy weight is way off, because they are surrounded by such obese people.

I: Yeah I think we've had this discussion before, like if they were kind of in a hospital of body builders I'd imagine they'd be kind of- (interrupted by staff member walking into room)- so yeah if they are, if they were to be in a clinic of body builders or fitness fanatics they'd be different because their level of comparison would be skewed

P1: I think so, I think people normalise and almost- I've definitely heard patients say 'awh y'know umm I'm not as bad as him so therefore I don't have to work so much'…

I: It's almost like they're validating their kind of behaviour…

P1: Yeah I would kind of say normalising obesity really but they are surrounded by-

I: Because the environment is so obesogenic?

P1: Yeah and I think, I think in society in general we use food to show that we care y'know food is part of celebrations whether their happy celebrations: birthdays, Christmas's, sadness: funerals, y'know people eat when they are happy and when they're sad, when they'r bored, lonely and that's just amplified in this environment I think, umm whenever a student nurse leaves the ward there's tones of cakes umm and obviously that's fine but it's kind of modelling that food is the predominant way to express something, whether that's gratitude or whatever umm but without the ability to have more exercise, to have more balanced food, people have said that the food choices aren't great umm in terms of the uhh meals provided

I: Because of the choice or the actual food that is provided?

P1: Both. I think they are fairly limited for choice umm and people often complain 'awh we've had cold teas 4 nights this week' I don't know whether that's just sandwiches and stuff umm and then people go and binge, y'know crisps, biscuits and things like that so I'd say that. I think the availability of food in the patient shop umm is y'know not great, I think there's been work to try and improve that.

I: How healthy the foods are or the choice?

P1: Umm I, to be honest I am not 100% sure, I've never actually been in and looked for myself but as I walk past, most of it crisps, chocolate biscuits

I: Yes that's my experience of the shop. Do you know what initiatives, if any, have been taken to kind of combat this kind of stuff.

P1: It's an interesting question. I think there was work done around maybe modifying some of the choices in the shop, umm, I think capping takeaways to one night a week, I think umm I don't know how long standing that is but I know that that is fairly well implemented that people will have a takeaway once a week as opposed to several. But the amount that one person can spend on a take away, like £25 is completely excessive but again y'know it is balance between people's capacity to make those decisions umm and we have to think about that, we can't just restrict umm. In terms of other initiatives y'know things like the walking groups again, that was, people were essentially using that as a smoking group umm and that was- it's really hard to motive people to want to- not all patients but, but there's a cohort of patients that are really demotivated stuck in quite a rut with their weight umm I know there's (name and designation removed) that has started like a health and wellbeing- kind of like exercise initiatives but also like dietary advice. I think that's another issue, people genuinely don't really understand umm healthy choices. So a patient of mine that I am working with is

78 significantly obese and he was really proud of himself because he went out and bought a
79 pasta, chicken and bacon salad when actually the calorie, fat and sugar content of that salad
80 was excessive but because it was packaged as a salad he was incredibly proud of himself and
81 just doesn't have the awareness, so I know some work is being done to help patients look at
82 the traffic lights system on packaging umm another patient I work with who is diabetic and
83 overweight had really odd ideas about what was high sugar foods and what was low sugar
84 foods and it is complicated because there is sugar in so many foods that you wouldn't
85 necessarily imagine, yeah so I think y'know some of our patients a lot of our patients in terms
86 of their backgrounds of trauma and neglect, they haven't grown up with healthy scripts for
87 balanced food y'know this is a generalisation but not many people would have had dinners
88 around the dinner table as a family and balanced meals, portion control, things like that and
89 there's a- going back to my point about using food to show care: I think families do that, that
90 they've got really limited means of showing affection and care to their loved ones that they
91 use food and bring food in to demonstrate that they care and also patients can be quite pushy
92 and demanding to for their families to bring in food as well. Because we as a clinical team we
93 try to put restrictions care-plan, the man I was talking about who bought the salad thinking it
94 was healthy we've umm, when he has leaves he is limited to one non-sugary drink and not
95 allowed to buy additional food umm to try and mean that his leaves aren't just about going
96 out for food however, that is well and good but he will go and spend X amount of money in
97 the patient shop, y'know binge on- he was saying he'll just eat 4 packets of crisps and a large
98 bar of chocolate in 10 minutes so almost feels like we are defeating the point and actually by
99 really restricting him, in the community he's not learning to manage that himself and take
100 responsibility for that.

101 I: well yeah there's literature showing that restraint eating is related to binge-eating

102 P1: Well yeah and anecdotally I heard a patient today 'I'm not gonna eat tea today' or ' I'm
103 not gonna eat lunch' so I think they've got this idea that if they skip a meal that they'll lose
104 weight but another patient that I work with, he's got long standing issues with his weight in
105 terms of restriction and binging and he actually had a hunger strike previously umm but he,
106 he was missing meals but eating a whole bag of mint imperials umm well two bags in fact,
107 which equated to 2000kcals just from mints. He was under the impression that they were very
108 low calorie but they were the full sugar mint imperials and umm so he was skipping meals
109 and binging essentially on these mints and actually consuming 2000kcals a day just on mints.
110 And there's a lot of shame behind that y'know, it took a lot of work to get to that point where
111 he could acknowledge that that was what he was doing umm, because I think people do
112 secretly binge, I know people that I work with they will go into their room and get into the
113 habit of watching a film and binging or their just feeling a bit low and they binge.

114 I: well food is such a good short-term way of making oneself feel better. Is there anything
115 you think the service as a whole should be doing less of?

116 P1: Umm, I mean I know that when you go on the wards they've always go bowls of fruit on
117 the tables, umm people don't really want to- y'know when they've got that or the choice of a
118 pack of biscuits they're gonna chose the biscuits. I guess, just from personal experience when
119 I'm doing more exercise I feel much healthier than when I am stuck in a rut of not exercising
120 so I kind of think the 2 are so closely interlinked I think that if people- (phone rings) to be be
121 more active, then by that nature they may umm, they may umm, they may chose healthier

options, y'know we know that people binge, well anecdotally, people will tell me that they binge far more frequently in the evenings when less is going on so it might be focusing on that time umm to either get people out of their rooms or engaged in something or make sure that they're having a decent meal because they have their food so early as well at like 4:30pm, that's their dinner time y'know. They do have supper but people's sleeping patterns too are interlinked, there's- most patients, again anecdotally, most patients don't seem to get up for breakfast so then they have their lunch at 12:30pm, their tea at 4:30pm and then sort of supper and that's just kind of an odd time for people who are probably going to bed at around 11 o'clock at night. So even the mealtimes have got something to do with it

I: Uhh okay, so kind of the last thing: if you had a magic wand, uhh is there one thing specifically that you would change?

P1: Uh, I don't know. I would say, the food that- having restrictions on the food that is brought in because just again anecdotally, families seem to bring in bags and bags and bags of crap. Umm, 'cause you can kind of y'know- I don't know if there are limits on how much people cant spend on the patient shop but then you have to balance that with capacity and umm y'know restrictive practice, blanket bans, those sorts of things but essentially y'know families and us are kind of colluding and killing patients.

-- End of interview --

Appendix K

Study 3 Transcript 2

I: So, as you know I am doing a study looking at weight gain in secure settings and the first question I've been asking people is, what are their general thoughts on kind of patient's general physical health, what are your kind of thoughts on that?

P2: umm, I guess physical health covers a broad range of different things within mental health, umm within a hospital context, so I guess kind of from observations, speaking to patients umm weight gain is something that is a big issue, umm people contribute a number of factors related to that, umm in terms of umm, some people don't have a huge amount of access to leave the hospital, in terms of their leaves which is quite dynamic and can be for lots of different reasons. Sometimes people talk about low motivation, so activities and things may be available, but their mood and motivation can be a bit of a barrier. Boredom as well and that kind of cycle people get into, can be a factor. Medication, and people talk about certain medication, rightly or wrongly, kind of increasing appetite umm and feeling quite out of control with that, putting a lot on if it's down the medication it's really difficult…

I: Have you noticed umm, when patients come in, do you notice kind of uh big difference when they come in?

P2: The trend is that people tend to put a lot of weight on. Actually, if people don't thats kind of more noticeable. That may be my own bias, umm but, it's interesting you say that and I was in the grounds yesterday and I saw a male patient that I saw on admission and I was struck by he hasn't put a lot of weight on. And that's the difference, because the general pattern for a lot of people, not everyone but the general pattern is that people do put weight on and umm speaking on the ward that I work on noticing a massive increase for a lot of people, particularly around the waist. Just kind of ballooning.

I: Uhh you've kind of touched on it already but what would you say are the key contributing factors…

P2: Umm, I think people talk about having less choice, even though there may be a variety of different menu options they're still kind of bound by, umm they don't have a huge choice and they can't cook certain things that they want to on a regular basis, they may have OT sessions, umm but on the ward that I work on people don't have access to the kitchen. Umm it's quite hard to maintain the type of cooking and diet that they want to follow umm, is something that kind of gets fed back about that. Umm people will talk about umm the impact on kind of mood, mental health with eating through the evening and nighttime, snacking a lot and a lot of what people have access to is food that isn't necessarily supportive of a healthy lifestyle. There's a shared fridge that I am not sure how much space people really have for with that. Often people keep a lot of dried food in their lockers which they can use as and when, umm and people do, people may do kind of shops less frequently so kind of buy things in bulk and because of kind of broader snacking they kind of get through things quite quickly. I'm not sure, I mean obviously there's a patient shop on site as well, and I'm not sure what sort of variety of things are available in the shop, I know there are treats and it is what I would get because it is available. Umm I guess close to here, there's not a huge amount of shops within walking distance for a lot of people. The garage is one but again I'm not sure –

it's quite expensive and variety is limited, umm again you would expect there to by quite sugary foods there, crisps, chocolates and sweets.

I: So, do you know of any initiative that have been undertaken in the service to combat things like obesity?

P2: uhm I think um, there is a lot of individual focus and within that there would be working with ward staff, umm working with house keeping about the options available and support people can have. I think a reflection, and something I hear often is staff feeling powerless and patients feeling powerless and out of control as well and in terms of being able to stop people eating certain things and being able to choosing, having the choice to eat certain things and avoid certain things. Variety is a big thing and umm you might hear that kind of how, not intrusive, restrictive can you kind of be about that umm it's something that staff may talk about in terms of peoples best interest and capacity, people here typically do have capacity with what they eat and kind of putting interventions in, unless it's collaborative is not going to go anywhere umm and you know as you can expect in a forensic service mental health and mood can fluctuate quite a lot of access to food and eating and things like that is a way of coping and the boredoms are about of it as well. And I think that even if you are not restricting, eating is a big part of how people socialise and kind of sooth umm how they spend their time, what they think about so you know it's a big feature, not for everyone obviously, but for many people it is, people talk about food a lot. And there's a lot of pressure I think with different fads and diets and kind of identity issues around image and I think for both males and females umm and with that there comes these at times these easy, well not easy fixes but these umm, uhh kind of tablets or kind of different products that can be used to kind of facilitate these changes and that people who are kind of vulnerable to wanting to make changes but not feeling they can put a lot into that, it's not always the most helpful.

I: What would you say about the self-normalisation of patient's weight within what could be called an obesogenic environment?

P2: Yeah and I guess that may fit in with kind of almost an inevitability with kind of going on medication being in hospital and that comes with kind of a feeling of perhaps normalising but also helplessness about being able to overcome and manage difficulties because there are things that are out of our control to an extent. Uhm (laughs) access to dried snacks is something that people do have a certain amount of control over, but certainly I guess here, there are, it can go both ways because I think there are, there are some patient led initiatives about supporting each other, emotional support, advice umm, kind of attending different gym activities umm, so so I think it can go, it's there is a theme in terms of umm people comparing themselves to others definitely and there is some sense of normalisation with that umm, and that can fluctuate I guess depending on the dynamic on the wards. There are people who kind of take a lead in promoting healthier living as well and it kind of varies I guess. One person can have quite a big impact and one person can have a positive impact on the rest of the ward but I think that fluctuates and I think that it's a bit more powerful when it comes from within the patient group itself in terms of motivation and supporting eachother umm, but umm, yeah I do wonder about the kind of feelings of out of control an'd it's gonna happen there's nothing I can do about it' and 'it's hopeless' and it comes with seeing others who put weight on as well.

I: Umm, is there anything you could say that the service could be doing less of?

P2: Umm, I think when, I think when it comes to, to medication, again coming from someone who is not acutely aware of all the ramifications, implications and side effects of use of different kind of medications, I think umm, kind of full awareness and informed thinking about the potential concerns about using medication and how it impacts on physical health is important. I think it does get spoken about, but I am not sure how much in terms of a balance, if something is thought to really help someone mentally, maybe that's given priority than the potential physical side effects and how open those discussions are. I think ideally, umm, patients across wards, it may be different on wards but patients could have a greater access to a working kitchen and to me that would be helpful and beneficial and maybe not necessarily able for a forensic service to contemplate and implement because there is a lot of caution and access to certain things. But in terms of empowering people to make decisions and take ownership I just think it makes sense. To give people more opportunities, rather than kind of prescribed menu choices I suppose, but practically that's quite difficult and there are barriers that come with that, umm I think the service has tried to put in health and wellbeing group representatives across wards but again the kind of engagement and motivation to participate in that fluctuates so, like there needs to be some consistent figures involved to maintain that and whether that comes from because, you know, in terms of shift allocation and in terms of how work within a shift they are allocated different roles around procedural and environmental security and things like that, but is there any reason why staff teams can't have more imbedded physical wellbeing champions or promotors or, just designated people or just to change the culture to facilitate patients to take the lead in it, I guess, rather than doing two, it enables the patient group to come up with things themselves and take ownership with it. So potentially more of a focus on the role of staff to be able to do that.

I: A lot of what I seem to be feeling across the wards is that as soon as patients leave these wellbeing groups and stuff that the focus on their physical wellbeing disappears and I just wonder if it would be good to reinforce the thinking about ones physical wellbeing once they leave these groups-

P2: I think that's the issue and it's not just in relation to physical health, the kind of generalising skills that people learn in different things, kind of outside of those specific structure sessions, you see it in a range of different multi-disciplinary areas and they try to implement something and have they take it outside of the room and that's not unique to physical health I don't think but it is a common difficulty to enable people to be able to carry it forward and carry it on and it does speak about the culture

I: Last kind of thing I wanted to ask was if you had a magic wand… what would be the key thing that you would maybe change to sort the issue out. Is there one you would take priority over?

P2: I think for me, if I had a magic wand, I think people wouldn't put so much weight on… so they'd be slimmer so I would just do that… umm but umm in order to help people get to there, it's a difficult question, uhh (long pause). I think what I'd like is for there to be some sort of imbedded, imbedded physical health service or support across the wards umm, because I think a lot of people do cover physical health in their jobs but it's kind of one thing of lots of different things but to have individuals ideally, as opposed to it being all down to one person, but a team or existing staff group who have the time to have a role umm, to able to kind of have on going conversations and support and negotiation and collaboration with the patients about physical health, like we have a dietician service but the same of most services you know you just want more of it and have it just more embedded and more

available because I think the weight gain for a lot of patients is a scary issue and we know that for lots of people within, detained within mental health services they die a lot younger and the same with certain diagnoses such as schizophrenia, what's described as emotionally unstable personality disorder, people will die younger and how of that is related to, y'know the negative effects of poor physical health is something that we need to be able to make some progress with as soon as possible

I: Alright cool, thanks (name removed)!

-- End of interview --

Appendix L

Study 3 Transcript 3

I: So, as you know I am doing a study looking at weight gain in secure settings and the first question I've been asking people is, what are their general thoughts on kind of patient's general physical health, what are your kind of thoughts on that?

P3: So obviously we have lots of patients who tend to gain weight when they've been admitted, although I can see staff intentions to try and help manage this I don't think it's their priority within the service, I think it is a secondary objective where the primary objective is mental health.

I: Have you noticed umm, when patients come in, do you notice kind of uh big difference when they come in?

P3: Yes.

I: Okay, so what kinds of things have you noticed specifically?

P3: So when they are admitted obviously they are quite restricted and they do gradually get access to activities and the gym but a lot of them don't use it and I don't think staff encourage it, I don't think it is a mandatory aim to encourage exercise , yes you have the patient that ultimately has their choice on whether or not they want to exercise, I think staff could be a little more active and proactive in encouraging patients to take exercise more seriously. I also I think food is the bigger issue, because weight gain is 80% food and 20% exercise. I think the meals prepared for patients is quite poor quality. Like you only have to go to the café and it's not exactly the most nutritious food. And I also think that a lot of staff aren't reflective of a very healthy eating lifestyle and if they are eating those sorts of foods it's social modelling which its telling patients that's it's okay to eat those types of foods. In clinical team meetings you have biscuits, cookies, chocolates all in the middle of the table and we'll have a patient come in and their weight might be brought up about them needing to lose a bit of weight and yet we are sitting there eating cookies and biscuits in front of them and our service is all based on social modelling and yet we don't seem to understand that social modelling is also important in terms of food.

I: Uhhh, so what do you think the service needs to do less of?

P3: I think being a bit more mindful of what we are eating in front of patients, so I think replacing the cookies and biscuits with grapes and fruit. And I think it might seem quite trivial, but I think that it might actually have more an implicit impact on the service in general. I also think that there needs to be consideration for having an open kitchen because I know that patients did, I don't know whether that has changed, have access to the kitchen and food and perhaps not be too restrictive but be more focused on how we managed that with the restrictive practice to kind of stop them from wanting to constantly eat crap and they have takeaways every Friday – yes we don't want patients to not be able to have a take away because if they weren't in the service they could have a take away whenever they want, but perhaps giving them flyers and brochures of more healthy take away options, rather than Chinese and Indians, because there are other healthy take aways.

I: What uhh, do you think about the level of patient choice when it comes to food?
P3: I think that, umm, I think they have a choice of what food they pick because I know they are allowed to request staff place an order but I think they are picking poor choices and I don't think staff kind of encourage them to kind of pick more healthy food. I'm not blaming staff or the service, because obviously it's the patient and you have to try and change their mindset, but they aren't going to change their mindset without help. And with exercise, we do kind of say do you want to go to the gym and if they say no you can't force them to go to the gym, but I think once they say no we don't really do anything more. So, it's kind of how do we get patients to want to go to the gym and not just go to the gym but how do we get them to want to go to circuits session...

I: What initiatives do you know of that have been used to tackle weight gain?

P3: So obviously there's the gym every day but logistically that has issues, I know they have that health and well-being group but from what I've heard of it, it is, I don't think it's that powerful in terms of changing attitudes to losing weight and I think that can be improved. And I, I haven't really heard much about healthy eating or know much about what really goes on to tackle kind of weight control. But also, I also, I don't want to sound horrible, but I do think some staff might not have that attitude to be eating healthy so how can we expect patients to be eating healthy as well, so it's a difficult to kind of manage that. I think the staffs actions should change to positively influence the patients as well as encourage patients to be better, so like I have been to a CTP where they have talked about a patient being within the obese bracket based on their BMI yet, a few staff there are bigger than the patient and it's like well if they are looking at us and they think well who are you to tell me I am fat when some of you are fat, so I think staff should be a bit more, have more insight into the influence that they have on the patient.

I: What do you think of the idea of the normalisation of being overweight on the ward?

P3: I think it has a significant impact, yeah if they come in on the ward and they are, well not thin but healthy, if they are seeing people bigger than them they may be more comfortable gaining the weight if other patients are bigger than them and they may not perceive themselves as, not abnormal, but different from everyone else. Whereas if they compared themselves against a healthy outgroup, they may be more inclined to be more conscious about their weight gain. I think it's normalisation for staff too, I know I keep going on about staff, but we are normalising the eating of junk food like in the CTM for example.

I: alright so, if you had a magic wand, what would you change, implement or take away?

P3: If I had a magic wand, again it's going to be a waffle statement but I think that a lot o what people allude to is exercise but I think food is more important so I would probably say if I had a magic wand it would be to get more patients and staff to incorporate more healthy food courses or food prepping service so like having a salad hour at lunch time, everyone at lunchtime makes a salad or, I know sushi might be a bit expensive trying to source in a hospital but having a day where we make-having each day where there is a healthy meal option where everyone to make a certain food together, that is healthy. And that will educate patients on what healthy food actually is.

-- End of interview --

Appendix M

Study 3 Transcript 4

I: So I want to know what you're thoughts are on patients physical health in the clinic, just generally.

P4: Uhh, umm, I don't think there are very many physically healthy people. That sounds really harsh, but a lot of mobility problems, you see them walking really slow. Obviously, I think for the men because I don't go to the women's ward so often, so just speaking for the men, umm I, yeah, the majority are overweight y'know, even the ones who are not obese seem just to struggle to get around just as much. And the women, uhh, are overweight as well, the little I see of them but generally they don't seem to be very healthy. You hear in CTM things like thyroid problems, umm, things like anaemia this and that, and they just seem not to be generally very healthy people

I: Have you noticed a difference in newly admitted inpatients after a couple of months of them being in the clinic?

P4: Noo, I can't say I've noticed but I also can't say I've looked. Because there's not many- because I moved teams, I went from team (removed) to team (removed) and yeah I haven't really seen a decline in physical health from admission.

I: Ok so what factors would you say influence poor physical health the most?

P4: Well they don't walk. They don't go anywhere. And I'm the same when I work from home and I can sit and I can do 100 steps a day and that's awful that's so bad I feel dreadful on days, or weeks when I am working from home all week when I don't go anywhere, that's them that's there life. Like I know they have little leaves to the garden but how many times can you walk around the same garden- and they say that 'I've done that, I've seen that, I don't want to go back out there' so, they're not walking and I think if they were just walking upstairs, walking to the kitchen they haven't got stairs to walk up they are just generally walking from their rooms to communal areas and back. That's it. I think they walk to their groups but they're not generally walking far

I: Do you think that speaks for the space that they have- the amount of space that they have to be able to move?

P4: Ok so if you had asked me that yesterday, I would have said no. But now that I have seen (service name removed) and how massive their communal areas are and that their bedrooms are really far away from the communal areas where as some patients on (ward name removed) ward wake up, they walk out of their room and they are in the communal areas. Kitchen, communal area, table, chairs, sit. They get out of bed, walk into the communal areas, sit. Unless they are playing pool, they are sitting down, they are sitting- I never thought about it, but they are probably sedentary for 23 hours a day. In (service name removed) the communal areas are all spread out, even the gardens don't feel very accessible, you know when you are on the ward you can't really see the garden can you, if you're playing pool or having a cup of tea you can just see the tv room or whatever and you can't see out into the garden. I think the other thing is that they can't see the courtyards either, so unless you are

sitting in the tv room you can't see outside and so it's probably not on your mind to go. So that's one of the main things I think, is that not walking around. Eating obviously, so whenever I finish a session with a patient I always ask 'what have you got planned for the rest of the day?' and they say 'going to the shop to get some pop'- the conversation I am going to get every time. 'Ow I'm going to go up the garage to get some crisps', every time I ask a patient that it's always- or going to OT, cookery. And it happens for others too like I am planning my dinner in my head now whilst we are talking and I think they are the same but they don't have much in between and it's like you always say in your presentations they don't have like the pleasures associated with the outside and y'know food is a big one.

I: So you know, the eating is obviously going to contribute and could be argued to be the main problem…

P4: I think lack of movement is a big thing though as well

I: Yeah absolutely so eating and lacking movement seem to be the 2 main factors; do you think that one is more so than the other

P4: Yeah so they are sitting around all day y'know and if they did the resting- you know the resting heart rate, the amount of calories you burn resting without exercise, I bet theirs is relatively low and if their resting calorie burn is so low that just a few hundred calories extra will make a huge difference

I: And I think that what their calorie intake should be based on the amount they move and will likely be something like half of that of an average male

P4: Yeah, I would agree, or they would have to move twice as much as an average male which I think would be easier to do.

I: I think there would be a ceiling though y'know, like they would need to walk a hell of a lot to burn the amount of calories necessary to keep them from gaining weight based on how much they are consuming

P4: yeah and y'know with this diet if someone told me to stop eating something I'd be like 'No!' but if you told me I should go for an extra walk, I wouldn't want to do it but I'd be more inclined to. I know they have walking groups and stuff, which is once a week or something, you know what honestly, seeing (service name removed) and seeing how their communal area is glass and all you can see outside is the outdoor space and it's easier to just pop outside and that's an extra 10 steps 20x a day you know. I don't know how much they are allowed out but yeah

I: So being sedentary and eating too much are big contributing factors…

P4: yeah and I think that a lot of the activities that they do do, are focused around food

I: Any other factors that might influence the weight gain and not related to what they are putting in their mouths and not related to how much they move?

P4: Umm, I know a lot of them have pretty poor sleep hygiene and I know that that can cause weight gain and I've seen that like I can't see patients until after 1pm because they are all

asleep and all day. Staying up all night, until the early hours, sleeping all day. And I don't know how that impacts weight, but I have seen/read that it can impact weight, don't know how, I don't know if that's because of increased eating but that can't be good. Less time to walk when you are sleeping in all day! I am sure there are physiological reasons why it's related to weight gain and I think sleep hygiene has got to be it. I was shocked, I know a lot of people moan about how much they sleep but actually seeing it for myself when it's pointless going down before 1pm.

I: So any ideas of any physical health initiatives that they have tried in the service?

P4: I know that they have tried, they really encourage exercise, I know they try and facilitate walking groups, swimming, try to take them to the gym when they can, I know there was/is a weight management group but I don't know what it is, or if it is a thing (laughs) , yeah, and I don't think people (patients) care. Some of them are insecure about their weight but I don't think they are doing much for it. Except there is one, (name removed) has made a big difference and he's lost weight and he is trying really hard, swimming twice a week, every week, he's walking all the time as much as he can, he's swapping stuff like he's swapped crisps for nuts or something like he comes to CTM and he said he tried something for the first time like a rice cake and he was saying how he loved it and was gonna eat them because they are good and they are healthy. I feel that socio-economic background must, if they are not necessarily overweight when they come in, it could be down to other things, drugs can make you lose weight, y'know people who smoke are not as heavy and they all bloody chain smokers and I think there's a huge thing and I am not sure if you have thought about this, you probably have, but the vast majority of our patients come from poor socio-economic backgrounds and so they are not necessarily educated families and those families outside of this world in general, they are more overweight. Interestingly. Wales is one of the most obese countries in Europe…

I: It's one of the most poverty stricken too

P4: …exactly, they are not, they say that being healthy is a middle-class thing for the most part, the food associated with this healthy lifestyle: quinoa, kale, avocados-they're not cheap. You know what is cheap; smiley faces. Chicken nuggets. Bags of crap for a couple quid. And this is where the patient's families come from and I just don't think that they would know how to make a healthy meal. I think that these patients who come in and gain weight when they get here just don't have the knowledge or understanding to be healthy, I don't think they know what's healthy, I think they are used to eating crap and then when you say is that a healthy lunch and they are like 'a salad is rabbit food', as if salad is the only healthy option and vegetables are boring but they don't have to be, roast them, put some seeds on them. So, I think background much place a huge role, not knowing what is healthy, what snacks are healthy, I am making huge assumptions but it must be. I only say that after to talking to (name removed) because he was blown away by veganism and you know he came from a household that would have prioritised pizza and chicken nuggets and I-I don't know.

I: Yeah so, I think like if you are from a low socio-economic background your priority might be making sure that your child's belly is full, because you have other things to worry about y'know…

P4: This is gonna go on a bit of a tangent now but with things like breastfeeding, they say breast is best. And some people are shamed and made guilty who don't breast feed but maybe

they can't and they think that fed is best. They haven't got much money and they aren't looking for quinoa and mixed vegetable salad they are trying to get their kids fed. Fed is best, they don't want to let their kids to go to school with an empty stomach; give them a packet of crisps and that is a societal thing.

I: So what do you think that the service should be doing more and/or less of?

P4: Umm, I think, I think they could do less of, like sitting. Because the staff do it aswell, when you go on the ward- I'm not saying they should be going around doing Zumba all the time, but when you go down they are all sat. I don't know what else they can do, but I think sedentary activity. Ahh I don't want to be rude to the nurses but when you go down into the nursing office their draw is full of biscuits and they always offer me a biscuit and a cup of tea which is so lovely, but there's a lot of biscuits on those wards so I think it's the nursing culture too so maybe they could lead by example. Like I see some nurses and she had a bag of carrots and a thing of hummus and y'know patients might see be like 'oh what's that?' and so less of the snacking themselves (the nurses)

I: So less of the negative modelling from nurses?

P4: It's a NHS thing isn't it we are meant to be positive role models and from an eating point of view, these nurses probably go home and have lovely, filling, healthy meals with their families but in work they are snacking on crap, you know I'm not blaming them they are doing 12 hour shifts, they want comfort food but it doesn't matter what the motives are they are eating shit. I think they could do less of that, less of sitting and I think probably, less validating the patients eating crap. I'm not saying scold them for eating crap, but I've been on the ward and a patient eating two bowls of cereal for breakfast. I was shocked at the calories of cereal, I was pouring my own cereal and I weighed out how much I usually would have and it was 3 portions. I have seen patients have two bowls of cereal of the size that I was having, that's 6 portions and so, obviously I think people could do less of that. And where that came from a patient earlier said 'to Weetabix or not to Weetabix' and they said 'ahh go on have some cereal, have some mun, might as well'. Less of that.

I: Ok, yeah. So, like there's a bowl of fruit on every table on each ward and it's always full…

P4: yeah and I always comment and say 'look at all the lovely fruit, can I have a grape' and they are like 'help yourself', so maybe, less of the 'yeah go on eat that if you want' and may be more of the 'instead of that, have an apple'. I don't know if they do it all the time but I noticed it this morning and I thought 'there's no need for him to have that second bowl of cereal'.

I: So, is there anything you think they need to do more of? It's hard to answer this question without answering the other to be fair but…

P4: More of. I'm gonna flip it; more modelling healthy eating habits. More just, it's hard living in Wales is cold and wet and, in the winter, I could stay inside every day. I get it, I'm not judging. But more of 'let's go for a walk'. And the nurses could do it too, you know I think it would be mutually beneficial to have like a, ah they are really understaffed so it's so hard to make this suggestion but, a walking buddy. You know, just, every nurse is paired up with a patient on a particular day and they go for a walk, get some steps in. Using a pedometer or something. And some like initiative, who's done the most steps in a week, so

like a challenge, make it a game. Do you remember Pokémon go? More of an environment where activity is praised. It's not encouraged, they are ambivalent to it, there's no culture of it either way. And they don't have to make it like 'ah this is a weight loss initative' just bring it into everyday life, bring it into the [service name removed] ethos because they do not have a healty ethos at the moment. It doesn't even have to be restricting food, just making subtle changes or increase moving

I: Ok so if you had a magic wand what would you change or add?

P4: Awh I'd love one. I would increase walking, movement, mostly. I don't know why I keep going on about that like it's more important than food, but I just think they just don't move. So I would do something like I would get a Fitbit or do like a Pokémon type app. I would make walking, exercising, swimming, running fun.

-- End of interview --

Appendix N

Study 3 Transcript 5

I: So, first thing I wanted to ask was what are your thoughts generally on the physical health and wellbeing of patients within Caswell Clinic?

P5: Okay, well um, what I'd say is-is, as you probably know, patients with mental health problems have a higher rate of physical health difficulties, probably through a range of different factors: socio-economic, lifestyle, smoking umm, and factors associated with their illness per say umm and of course umm medications can also contribute to that, so I think it is clear that the patients here in the hospital have higher rates of physical morbidity, more physical health difficulties, I think we do try to address those, I think we have a reasonably good program in place for managing those in terms of regular check-ups, policies underpinning those, access to GP input uhh and awareness of things we need to look out for, test and monitoring and interventions to-to minimise the risk of mental and physical health problems as and when they arise.

I: Okay so you've of mentioned that there are lots of factors, are there any in particular that contribute most, particularly within an inpatient environment.

P5: Well probably medication is-is possibly the main factor, the other factor is lack of activity, exercise is partly through lack of opportunity, or inability or motivation, I would have said smoking back in the day but now that we've tightened up on that it's less of an issue but certainly back in the day lots of patients used to smoke a lot, it's boring in here, so often there is not much else to do. Diet to an extent, but I think that is less of an issue, we do try and provide reasonably healthy meals, so I think it's mostly down to the medication and lack of activity

I: Right, have you noticed as new inpatients come into the service drastic increases in weight?

P5: I wouldn't say drastic, most patients tend to put on weight when in hospital, umm irrespective of what medications that they are on, but if we are looking specifically at weight gain I think those increases in weight are most marked in those patients taking certain antipsychotics and those patients really do very often and quite significant rapid increases in weight and I'm talking things like – I can mention drugs can I?

I: Yes of course

P5: Clozapine, olanzapine are probably the two main culprits…

I: Yeah, a recent study found the most a patient gained was nearly 30kg in 3 months and there was a large spread of kind of weight gain and loss in the sample

P5: It is very common, and you have patients who come in at a normal weight and then within three months they've put on a bout 10kg and it's not unusual and of course not everyone on these medications gain weight and why some don't is an interesting area for research

I: So what initiatives have been used to tackle physical health or weight gain in the service?
P5: Well I mean basically, advice, dietary advice, promoting healthy diets, trying to sort of limit access to unhealthy food in terms of what's available in the hospital shop umm what's available on the menus, just motivation and encouragement to eat healthily, exercise umm, they're probably the main things in terms of weight gain. I mean there are patients who put on weight and develop metabolic syndrome where you have to sort of start putting in place medications and that sort of stuff, but probably the same as any intervention aimed at people looking to maintain a healthy weight, it's exercise more and eat less or better.

I: Umm, is there anything that as a service we could be doing less of?

P5: Less of?

I: Yes

P5: So, by saying less of you mean taking away something that isn't helpful?

I: Yes

P5: I think, um, I think in terms of medication I always try to sort of be conscious of these medications, I mean it's a balance there's pluses and minuses, some patients need medication and you know the benefits outweigh the risks. I think sometimes it is important not to whack someone on high doses when they are ill and then leave them on that, I think you know minimising the dose of medication that is required, so you know taking it to the lowest level it is effective, if it is not just weight loss directly but high doses of medication cause sedation, apathy and other secondary factors that contribute. Always review the need for medication, some patients may stop or discontinue taking medications at some point, uhh, less off… I mean it is a difficult thing with interventions, whether we ought to restrict patients access to certain foods, I mean I'm not, I think we need to offer a healthy diet but patients who are able to go out and they choose to buy chocolate bars and crisps and so on you can't really stop them, umm access to takeaways, I think it is a matter of being proportionate, I don't think it is good for people to eat takeaways every day, but I think you know people do enjoy it and it is one of few pleasures quite often and I don't think it ought to be entirely restricted, umm less of, I think that's it.

I: I mean you have kind of worded it within your answer to the last question but anything you think we could do more of?

P5: More of… I think education on weight, patients often use medications as an excuse sometimes, 'awh I'm on clozapine' so…

I: it's like a self-fulfilling prophecy

P5: Exactly, yeah, whereas other patients who take clozapine I mean yeah it can predispose but I mean they make an effort to eat healthily, not eat every time they are hungry and manage to keep their weight in check even with these medications, so-so that educational approach is useful and the other thing is to encourage exercise and activity in as far as possible, I mean even if the weight loss is relatively minimal there are other benefits in other ways. Because you can still be overweight and relatively healthy, you know there's

different… it's not just about weight others can be a couple stone overweight and be pretty fit, be really active, have a healthy heart, healthy lungs, you know muscles and things like that rather than someone who's just totally inactive.

I: So, if you had a magic wand, what would you implement or take away what would it be to fight the weight gain problem?

P5: I think the best thing would be some sort of drug that would counteract the negative side effects of the antipsychotics. I mean we don't know exactly their effect on the brain but we think it has some effect on appetite centres in the brain so I think a drug that would combat that, that's pretty safe, that would go a long way

-- End of interview --

Appendix O

Study 3 Transcript 6

I: So, the first thing I've been asking people is what their thoughts are generally on the physical health and wellbeing of patients here at the clinic…

P6: Okay so in my mind it's a worsening picture for sure, umm, when I came here in 2004, that was around about the time of the advent of the new generation anti-psychotics quickly enshrined in NICE guidelines one thing and another and umm, recommended as being the way forward. Umm, but as time- they were very clever I felt at the time in marketing those drugs in terms of what they focused on and what they don't do without actually telling you what they do do. Umm, it was a little bit I felt, there was a little bit cleverly marketed but a little bit underhand because had people had advanced notice of the metabolic problems they seem to create you could have firstly off set them a little bit uhh or maybe thought long and hard about whether you want to go down that route of drug at all. Umm, and of course subsequentially further evidence has come out to suggest there are not particularly any better than the original anti-psychotics that we were using in terms of efficacy and certainly worse in terms of the side effect profile so, it was a bit of an eye opener for me because very quickly I can see the lipid profiles going wrong, a lot more weight going on with it going up quietly, blood sugars being high and so to my mind there was the potential for this because they were-switched over to so quickly and uhh so entirely, you'll have a little honeymoon period but there is a sea of morbidity attached to these [medication] that we will end up reaping the consequences of, and I think we are now, I think that certainly the population as a whole are much bigger now than they were back 15 years ago, umm and general level of ill health in the population is worsening as well and I think you may be able to evidence that if you look at the volume of hospital admissions and things for anything out side of self-harm and things I think particularly in the past year or so we are seeing more and more so I think we are starting to reap the consequences of going down that road quite as quickly as we did and I don't think there is any other 3rd generation drugs on the market that are devoid of these side-effects. And I think it is the nature of way that these medications are prescribed as well, so for example people will go straight to olanzapine rather than consider other options that are more weight neutral or looking at the side effect profile or the physical health of the patient and thinking hes overweight, there's diabetes in the family, there's cardiovascular disease in the family it may be a good idea if I don't use this one that I tend to use for no apparent reason other than they were the last rep through the door.

I: oh, really that's how you think that they decide which drug to use?

P6: Very arbitrary in my experience, if you ask them why particularly they've chosen that drug then they'll say 'well you know it works' well you know it does a lot of things too and there's consequences to that and there might be other options to consider if you look at the kind of comparison studies with the drug companies there's very little difference in efficacy between any of them actually. So to my mind they should be the kind of things that should form your thinking in terms of- are they coming in a mess, is this going to make that worse what will the consequences of this be in the next 10 years and you see a little bit more of it now but by and large in this profession particularly in this setting with mental health the physical health very much becomes a secondary issue, if not 3rd and 4th in terms of priority.

I: When you really think about it as well we have a lot of guys here, a lot of their problems lie in the poor self-identity, lack of self-esteem you know things like that and you gain excessive amounts of weight and it's hardly going to help that kind of problem…

P6: …and particularly with the women, you see a lot of self-harm and they take a look at themselves and they are horrified in a day and age where, yeah you're appearance is um is everything isn't it and it does real damage.

I: So with those that actually gain weight are there are particular factors, obviously medication is one, is there kind of any other factors that you think?

P6: Yeah, I think there are a lot of things here: the food to some extent can be a little bit repetitive, there's not a great deal of range you'll either have one thing or the other and what it might be is the devil in the deep blue sea, there's not an awful lot of difference, you might try to eat healthily but if the only option is you keep having a baked potato you can't have that every day for the rest of your life y'know so that's a bit limited and I suppose that comes down to cost per meal per person and what they are prepared to spend. Uhh I think now you've got things like accessibility to healthy, ummm, endeavours, even within the clinic they are becoming limited depending on the number of escorts you might require, can you- have you got the staff to allow them to access the gym to use things, possibly not, and If you have the staff available to go and do the rambles in the community, y'know these things are being chipped away at because their ability to access them have been limited I think that's an issue as well. I think without doubt, the fact that they are incarcerated here against their will is a major issue and it's kind of like two fingers to the world well I'm just gonna rob out and do nothing, obviously the negative symptoms and all that are a major factor in the schizophrenic patients umm but when you compare it to the general population who are not particularly motivated themselves, so it's not necessarily unique to them, I think it is just exacerbated by a number of factors like being in here and one of those is apathy and kind of a lack of control over your own uhh, yeah well over your life full stop really and I think they just lose interest and uhh. Kind of supported in some ways in what I've seen- when patients come back for bloods for example over the years, what I've seen is that they lose a lot of weight when they are back in the community

I: yes, this is what I've heard, that when they leave, they seem to lose a bit of weight?

P6: Yeah, yeah shopping, that's a disaster that wasn't thought through because you're caught in this kind of quandary of least restrictive practice but at the same time you're now engaging in stuff that's sort of contributing to their problems and we're actually facilitating it now, so these shopping expeditions to Sainsburys…

I: yeah I've also heard that they can order food off amazon, like blocks of cheese and stuff right?

P6: Yes one patient in particular ordered 3 blocks of cheese and lies in bed- his abdomen has extended to the point that his rectus abdominus has started to fall apart because he has stretch himself so far out now which is not something I've seen too much and yet I've seen a few of those happen here in the last couple years in fact one patient had to have fairly major surgery to try and correct it as well so uh, yeah that's certainly a problem. Uhh, I agree that they certainly should be able to do the shopping things, I think sometimes we have to throw a little party so there's a buffet on for anything and everything, Friday mornings breakfast rolls on

the ward, bacon, fried egg, fried mushrooms, they already have a brunch on the Saturday morning so yeah I just don't think we think about things sometimes you know and umm, portion sizes and things like that and I think the housekeepers will have the tendency to be kind rather than considered, so killing them with kindness sort of thing umm, I think there's a lot of factors within this setting that contribute to it to a greater or lesser extent umm, and yet some patients even on clozapine, and olanzapine, but even clozapine, they don't put the weight on so there's a small percentage, 15-20% who don't seem to put the weight on even though they are on fairly hefty doses…

I: Well this is the interesting thing, why do those that gain weight, gain weight and why do those that don't, don't.

P6: Well yeah is it a psychological thing, is it a physiological thing, does it affect some more than others, why isn't anybody looking at this for a start, it must be some research there to be done, why do some people manage not too is it behavioural or is it physiological

I: So yeah other than these interviews I am looking at other things like cognitive factors and psychological factors umm, but yeah, it's like- there's such a variance in the amount of weight that's gained…

P6: And of course, the trouble is beyond the weight gain period it continues on and on as well

I: yeah so, the literature shows it plateaus a little bit but does seem to continue fairly steadily upwards beyond the kind of critical 3-month period

P6: Yeah well some actually double their body weight, I can think of a few now who have doubled their body weight since they've been here umm and again I look at those people and think 'are they particularly lazy, are they the kind of less motivated' not necessarily.

I: See there seems to be a general lack of motivation and apathy but everyone kind of seems to be…

P6: no that's right it doesn't necessarily have to be those people who put the most weight on as compared to their peers so why would they put that much more on, I don't know umm but it is intreging and to solve these problems, you think about the morbidity that is going to be attached to it I mean morbidity is going through the roof, mortality is going down again in terms of life expectancy, so, because now I mean 15-20% of your life was chewed off anyway by and large and that was very long standing picture and it's worsening now yeah and I think worse it's going to get as well and we desperately need to think of something for example how do you cater for the patients. We don't even know that those things they sleep on in their bedrooms, that are essentially made of breezeblocks with a lump of wood slatted on top of it, did anyone do any testing to see if whether that can actually hold the loads that are going on there and that kind of thing. If you've got people who develop disabilities or where to have strokes or cardiovascular problems we got no way of getting them in and out of bed because they are built into the corner of the rooms so none of the hoists would work so we haven't really thought about in terms of the design and about what our patient group is going it look like in 10 or 15 years, they haven't future proofed the service and when indeed they went and built (service name removed) a few years after then based on the same model, why would you do that when you know that it is going to be a problem going forward

I: I hadn't even considered the issues of the design and structure of the building itself…

P6: No one even does the manual handling to a level that would be necessary to manage patients, it's going to change the whole training profile for the patient group, they might be on complicated cardiac medications and y'know complicated diabetes meds, you need to be able to get your head around those as well. You might end up with gangrenous wounds and toes falling off, you're doing dressings on people you've never had to consider before as a mental health nurse

I: well yes, I've noticed how it is a very mental health dominant service with a small amount of physical health-based staff: which makes sense to an extent of course because it is a mental health hospital

P6: and it is very difficult to get the message across to them that they really do need to take responsibility for these things, you can't separate them out, they are inextricably linked and you are handing to them on a day to day basis the medication that is contributing to that problem, so you might want to separate it out in your head but that's not how it's going to work and you will be held accountable so you need to take it more seriously, and is-there always has been- a very strong resistance amongst the work force that they don't see that within their remit really and I don't know why that is, it's slightly bizarre

I: I wonder whether the culture and mindset is that they are getting paid to do one job and that's to look after the mental health of their patient and everything else isn't their problem

P6: Yes that's right, that's how they see it. You can't be that narrow with it, obviously they are inextricably linked and you can't deal- it's interesting when the GP comes in for sessions and 9 times out of 10 the things that they are presenting with to the GP is related to their mental health either directly through side-effect profiles or health problems and concerns that come as a consequence of those y'know that's the way it is and you've just got to get your head around that. There's nurse training, certainly after project 2000 they separated far too widely, I think you need almost more of a generic training course that have a bit of both in them (physical and mental health), but you've got those core skills that you use and you understand the basic concepts of the kind of problems that tend to affect the patient, because you don't have any other choice you need to know it don't you, because people will suffer as a consequence so it's umm, its bizarre. The wheels turn slowly, unfortunately, but I think it's going to take generations of nurses to come before they grasp it properly.

I: Or until patients are actually dying and can't leave the room or seek medical help because they can't access appropriate equipment because of the layout of the building
P6: And these problems are being compounded when you have a transferred prisoner who needs 4:1 escorting to physical health appointments to address to these issues that we can't get them to because we don't have the staff to get them there, so they are cancelling more and more. We had a letter back yesterday about a patient who wasn't able to make an appointment for a particular on going issue due to staffing levels and they have been taken off the treatment list as a result, and it's not her fault y'know… we need to think through these things abit more you know, alright we want to fill the beds and fit the patients in but if they are 4:1 and we have an increasing amount of patients needing to go out for external health care appointments you are going to buckle the service in the end because it isn't going to be possible and it'll get to a point where something is going to go wrong and then there will be litigation and suddenly it'll be all over the place.

I: The worst thing will happen and then they'll shift their arses into gear

P6: All be it eminently predictable and I'm sick of saying it and I've said it so much now I think it's like white noise to everyone and they just ignore it you know but umm, the day will come it's not far off, unfortunately some poor bastard will be dead as a consequence of it and it'll be a point proven but y'know it's almost like what is has to take here before people grasp

I: So I've got a flavour of what we should be doing more of as a service, any things we should be doing less of?

P6: Umm, I think we need a bit more clarity about what we are doing in terms of, because you have these kind of umm, contradictions around stuff like umm, least restriction and then at the same time wanting to start up a healthy lifestyles program or a diet program but it actually requires you to restrict their access to unhealthy foods. Indeed one of the audits that came around the other day, and I can show you a copy of it (shows copy of audit), is asking if uhh, where is it… 'access by the patient to food with low nutritional value is controlled' so that is actually a standard now that we are being assessed against whilst simultaneously telling us that we have to have an approach of least restriction. What do they want us to do!?

I: So that's written into policy now…

P6: That's part of the assessment tool, they came to assess us last week…

I: I would love to have heard what their response would have been to 'okay that's fine, but we aren't allowed to restrict any patients within the service, so…'

P6: That's right. You don't even have any right to restrict the take away's and it was based on a prisoner in Scotland who challenged it legally and won and they said as long as you have capacity you are entitled to whatever you want and that's end of sports then isn't it they can have a takeaway everyday if they wished

I: yeah and there's been a recent review of a load of studies that looked at different weight loss initaitives within secure services and the most common feature was not restricting the take aways but modifying the amount that they were allowed to consume

P6: well yeah we got patients who are spending £25 on a takeaway for themselves

I: Do you know of any initiatives that have been undertaking to try and tackle the problem, be they psychological, OT based or what have you?

P6: Well, now that's interesting certainly the OT and activity co-ordinators were broadened out the scope of stuff of physical exercise nature that is available to people. We have opened up this (shows exercise referral form) I can do these now and I have a few do this afternoon, we have the exercise referral policy that GPs can use to send people to the gym so they can get access to gyms much more cheaply, and yeah we fill that out with a fit of basic information and I'll finagle it as such and do that (points to form to show certain physical health problems), so yeah they can access the local gym facilities more easily and more cheaply so- because that has a cost attached to it otherwise

I: How many patients have these?

P6: I'd say about a dozen but they are picking up in interest now so there's three others and they have to actively ask for it but in fairness the activity co-ordinators, once they get leaves and can access certain services within the community, will encourage them to think about it and give it a go and they take them down there and facilitate it or take part with them if they need to umm, so they are doing a lot more, they can access the pools if they want to go swimming which you couldn't do before, umm and other than what you can think of in terms of making it available to them- but I've always felt and that's not a criticism of your department, I've never seen any services that do focus on managing weight that don't have an involvement by psychology and in fact they are [psychology] central to it because of it is kind of motivational interviewing stuff, looking at this and looking at patterns of behaviour and yet it has never really seemed to be a priority here at all for some reason and I've never quiet been able to get it on the agenda by default it's there now because of the sheer scale of the problem, excuse the pun, is just too large to ignore but umm it never seemed to have featured much but I am glad to see there is a greater interested with it in the department now because I think they need to be the cornerstone of any kind of program that you can develop otherwise I am not sure if it is going to work.

I: Ok thank you that was really great

--End of interview--

Appendix P

Study 3 Transcript 7

I: The first question I've sort of been asking people is what their thoughts are on the weight gain scenario here in Caswell clinic

P7: It is a real problem. People come in many of them under weight and rapidly do gain weight. And I think that it is a multi-factorial problem obviously these are people who are very unwell and they haven't been attending to looking after themselves they can be underweight, uhh, but once they've sort of, uhh, been on the wards you can see on the graphs of the weight that the weight is just gaining and gaining week on week and I think there are a number of reasons for that uhh, firstly people are more sedentary because they are on the ward, secondly is the type of medication we give people and thirdly I think it's the type of food we serve people so, umm the difficulty is when menus are chosen obviously it has to be food that people want to eat but it is very much sort of around the very beige food, there's not a lot of sort of, what I'd say see as sort of healthy fruit, vegetables more raw stuff, I don't think there is an awful lot of things like that like fish, unless it's highly battered then it's reliant on carbohydrates so there is the healthy option, I've not seen it myself in use and if it is people don't seem to be choosing it. So, y'know what typical happens when people are acutely unhealthy they put on weight but as they get better they have more structure to their week, and they might have leaves, use the gym and start getting fitting so y'know often weight does start to come off by the time people are starting to leave but it is a major problem.

I: Do you find that when patients are admitted that there is a noticeable amount of weight gain?

P7: I think initially yes, at the initial part of admission yes.

I: And you were talking about food and the kind of food choices they have; do you think there is a problem with the variety of food?

P7: I do, yeah, I do. I think it relies too much on beige stuff, not enough fresh stuff. I think the palate is quite narrow and it's about choosing what people would eat, so you do wonder y'know, if salads were put out whether people would necessarily chose them and it strikes me with people on more of a health kick what they will tend to do is sort of have tins of tuna that sort of thing to sort of manage their, manage their weight and try and had more muscle mass. Umm but that tends to come later.

I: So we know, and I've seen your food and a lot of the time it looks delicious and a lot of the time it is very healthy, so it is obviously possible to create healthy food that is also delicious, why do you think that we aren't serving these foods in the clinic?

P7: Because it's quite expensive too. And they are more labour intensive. You have to have sort of a food chain to make sure the ingredients are fresh, you know I'll use fresh herbs for

example and you just wouldn't get that on an NHS menu, umm and it's about mass catering isn't it, y'know…

I: Cooking and freezing and not having to worry about things going off and wastage that kind of thing?

P7: Yes, yes, but there is a lot of wastage too because food is not allowed to be out for longer than a certain amount of hours and so I am aware that food is often wasted

I: Umm, do you know of any initiatives that we have undertaken in the clinic aimed to reduce the weight gain problem?

P7: Yes, it's gone through lots of different phases and I do know that when we were in the old building that patients would complain that they knew what day it was by the meal they were having and there was a 2 week revolving menu and it was really boring, very beige, very stodgy, very carbohydrate laden and so the idea of the chill freeze thing was to actually increase the variety, which it did and does give patients some choice on a day to day basis so that is better and then I suppose intermittently we've had input from dietetics who will y'know, certainly the dietician was advocating a low fat diet which is not necessarily right or healthy or the right thing to do for mental health problems so, umm, you know uhh one of the big issues was about portion size I think there's been measures to try and reduce the portion size because I remember looking at a piece of fish and thinking 'oh my god that would feed a family of four quite easily' umm, so yeah looking at portion size and trying to sort of get patients to do some cooking but they are a bit limited, so on the rehab wards they have got access to kitchens but they can't use any raw meat and eggs so what someone will do is buy a packet of cooked chicken and stir fry veg in a packet and some sauce to go in the stir fry to flavour it up so you know patients are encouraged to do that a bit more but I think it's a real shame that we can't do more cooking and include more patients in the cooking.

I: Yeah and if these patients can cook more tasty, healthy foods then they inevitably will understand that not all healthy food has to be bland

P7: yeah and the idea of a salad in Britain is a tomato, a sad bit of lettuce and a bit of cucumber but whereas y'know really, food can be a lot more exciting than that and a lot healthier and I think, y'know some of our patients have come from some really impoverished backgrounds where y'know a meal might be a packet of crisps and so it's a real opportunity to expose people to what healthy food could look like and taste like.

I: um, are there things that you think the service should be doing more of?

P7: Yeah, involving the patients with the cooking and decisions and introducing a variety of foods…

I: uhh, anything we should be doing less of?

P7: Yeah, less, less stodgy stuff, less beige foods, less carbohydrates. I think the portion size are a lot better but I think another problem is food that come from patient shopping umm, and

there has been some limitations on the amount that some patients can buy so for example they are limited to buy 10 things, so what they might do is get a multipack of something which counts as one item, there is also sorts of ways people can get around it and I try to sort of think, I'm not sure that the shop stores healthy stuff like it should because the stuff I have seen isn't healthy but clearly it's what people want.

I: So if you were to have a magic wand, is there anything that you would add or take away to improve this problem?

P7: I think I would really like to have a surprise meal, which is y'know, homecooked, something very different y'know umm, y'know a curry or a Chinese from scratch rather than a takeaway uhh and something that would really get people thinking about their taste buds and what's healthy, the breakdown of foods in terms of, y'know like a traffic light system that makes it simple to understand and encouraging people to read the information on food packets as a routine umm, and then another thing would be prescribing healthy activities, so you have a prescription chart and you could prescribe half an hour in the gym and I acknowledge it's not everyone's cup of tea

-- End of interview –

Appendix Q

Study 3 Transcript 8

I: So, the first kind of question I've been asking people is what their general thoughts are on the weight gain/physical health problems we see in the clinic…

P8: Umm, I have really mixed feelings about it and I sometimes feel that its just much too big a topic for us to deal with, I think umm, I'm kind of of the opinion that as a society we have a massive umm problem with, umm, obesity and we have a population of people here with kind of a perfect storm of factors umm, probably they haven't had great diets all their lives, they are in an incredibly stressful situation, they are in an incredibly stressful point in their lives and many of them eat out of comfort, the medication doesn't help although I know that's what you're looking at, umm and they are bored a lot of the time and that's something that we can help with but I don't think that there's a single solution and I think sometimes, I-I tend to concentrate on exercise over diet because I feel like diet is such a huge thing that I feel that we could have an entire diet program around somebody and we do not have the resources for that, does that make sense?

I: Absolutely, and when you said it's too big of a thing to manage, I completely agree, a three-year PhD is not long enough to find out what the problem is

P8: I feel like we could have a service that was just a weight loss service and that would be hard, but we might get results…

I: Yeah and a conversation that I've had previously was about there being a physical health team within the clinic

P8: Well it's an eating disorder isn't it, it's a disordered form of eating but we wouldn't, yeah…

I: The medication is kind of, as the project has gone on the medication has become less relevant for me, I think other things must be at play. Is there anything specifically that you think may be a key contributor, or something more than others than might be to blame?

P8: I think, and I know lots of people have discussed this, I think that the umm, the way that we provide meals isn't great, I think and again I know there's been discussion about this but I think that the timing of the meals, so they have lunch at 12:30 and then dinner at 16:30, big meals, and there's no way to get from 16:30 to bedtime without being really hungry and they do provide snacks on there but, I-I dunno, personally I feel that you end up eating a lot of food or a days diets worth of food squashed into this-this small..

I: …into the 9-5 work related timing schedule…

P8: Exactly, exactly. And then they end up hungry in the evenings and overeating because of that, 'cause the only way to do that healthily would be to eat your 3 meals and then fast for the remaining time and I don't think anybody could really do that. And I feel bad saying that because I think that the housekeepers do an amazing job and it really isn't to do with them

and I think it's more to do with the fact that it's, y'know, it's their [housekeeping] working hours and to do with the fact that we don't have food cooked on site…

I: Oh, food is brought in!?

P8: All the food is brought in, pre-cooked and heated here. I don't know the story, but I think it was about how the building was built so it is entirely out of housekeeping staffs… but it does mean you end up with very much kind of canteen food, school dinners, beige foods, and I really do think they do the best job possible with what they have and facilitating different diets and things, it just still ends up with too much chips, too much-I mean maybe that's what our guys would be eating anyways…

I: yeah, yeah, other discussions I've had included how some patients from particular backgrounds wouldn't actually know what a healthy meal is and that the priority for the parent is keeping them fed because they have other things to worry about y'know…

P8: yeah and it's probably what they have been fed, umm so yeah there's a massive issue with education around food. And frankly its similar to the smoking but this is the comfort for a lot of people in here, and the stuff I was talking about like the beige food, the canteen food, is comfort food for a lot of people as well and there's a part of me that doesn't want to take that away from them too…

I: It's-it's tough thing isn't, it's almost like- if there's one thing that can make them even in the short term feel rewarded in some way, feel pleasurable in some way, it's the food and take that away, what else do they have?

P8: and the thing is, if we have a solution, if it was y'know-smoking is a lot straight forward, quitting smoking is of course really difficult, but you could just say 'look it'll really be beneficial for you to quit smoking' but we don't really have a solution to being obese or overweight, of course reducing calories and exercising more but that doesn't work for most people, it's for so many reasons and so there's a part of me that worries- I really push the exercise because I think the exercise is so good it's much easier to do something positive rather than take something away, it gives people an immediate mood boost, it's all-so I am very pro-exercise but from the food perspective we just kind of nag people about it, make them feel guilty about this thing that is giving them some comfort and they are gonna end up eating anyway and they are going to end up having all this guilt associated with it too

I: yeah, yeah, I agree. Unless there is a ready-made solution that can be implemented straight away, there isn't, I mean if tomorrow they changed all the meals that they brought into the clinic as kind of satiating but low calorie there's your solution for the diet but y'know it's just not going to happen… is there anything you think the clinic needs to be doing more of?

P8: Yeah, this is where I struggle but I don't think there is a simple solution umm, I think we have a pretty good exercise program but that's always something I think we could push more umm, the facilities are really good so it's about how we engage people umm, but we have plenty opportunities if you wanna stay fit and a lot of our guys do umm, I think there's more scope for doing kind of peer support stuff with that, because one of the most effective things I've seen is one of the guys taking another guy under his wing and getting him to go down the gym, umm I don't know, I see the argument for limiting shopping and limiting takeaways but I honestly don't know if that's the solution, it does give people less free- just to control

their daily- less control about their world-I'm not articulating this well, it's also, it suddenly makes it a forbidden thing, like the smoking or caffeine on certain wards, as soon as something is limited it becomes more desirable. I mean you could be really strict about it, you could stop takeaways altogether, you could say no food or shopping y'know stop doing Sainsburys shops online, like when you're on unescorted leave. It would be detrimental; I don't think that- it turns into more of a prison then doesn't it

I: In the short term for sure it would be a bad idea…

P8: It's something else to get smuggled in as well…

I: Anything that you think we should be doing less of?

P8: (Long pause) umm, I don't know. I guess a similar answer. I guess some sensible control of what people buy in, but again I don't feel strongly about that because I'm not sure if- I suppose take away once a week rather than multiple nights a week so that it becomes a treat, rather than- I don't-the food in the patient shop isn't great, again I don't think that's the underlying problem, I think that's uh-there's limited, short of getting fresh fruit and vegetables, there's limited kind of-even the healthy snacks aren't that heathy, umm I don't think a shop like that could provide stuff like that

I: I think, the important thing to know is that they are eating too much and they may not be exercising enough, and it's- the thing we need find out is why and then tackle that problem, work from the bottom up as opposed from top down…

P8: Yes definitely, and again I think, I don't- I hadn't thought about specific but I just think that's the way to do it, I don't think there's any negatives to getting somebody into regular exercise regime and I think we need to be more open minded about not just making it gym and sports activities and more using the gardens more to walk, to being a bit more flexible, to find ways of keeping people active for the guys that aren't sporty, we have an ageing population here as well, they're not really very active at all so maybe finding something that they could enjoy. And I know that's not going to solve- I know that the research shows that diet is the thing that makes the difference to weight but I still think that we are better off having an overweight but fit and happy population that exercise rather than y'know- that's gotta be healthier

I: would you say there's a staffing issue, would an increase in staff help the problem somewhat?

P8: I think, I think it would probably require an increase of staff and umm maybe a slight cultural change with that but I think, I think if there was more staff on the wards hmmm, maybe that's unfair, I'd like to see more people just getting out in the gardens for regular walks every day and I think would be really hard to do with the current amount of ward staff- I say that but the wards are pretty good about doing-especially the recovery wards- about doing walking leaves a lot, umm and we've got- yeah, I'm thinking more for people who don't have leaves outside the clinic because I think there is a lot going on if you have external leaves and I think there's more that we could do internally. Umm a couple years ago or a year ago, umm on [ward named removed] they were having a little competition to see how many lengths of the Astroturf they could do in a day and so all the guys were kind of going out on the Astroturf and marking it on the board, it was a really great thing and one of the nurses

kind of came up with it and had done it off the top of their head. And I thought that was lovely, it would be really nice to see more of that…

I: So, what about giving some of the more influential guys on the ward responsibilities in terms of taking guys under their wing to get exercising

P8: Yeah well, I know that the health and wellbeing group has sort of champions and I think maybe they need more support and I think maybe ward reps need more support with maybe like somebody going onto each ward and championing there, yeah

I: What kind of initiatives have been used in the clinic that have been aimed at tackling this problem

P8: So mission fit is, I mean the plan for mission fit is to bring together the stuff we are already doing and I think that's kind of an overarching initiative to corelease everything that's already been going on, I don't know if we have anything in place, so usually one of the first thing patients do when they are admitted here is have a gym induction, it's one of the first leaves that's available to them so they get used to the sports equipment very early on, and so we have all kinds- there's a sports group that runs, there's circuits training that runs 3x a week which is a lovely short thing which you can pop into, there's football 2x a week, there's um the green group which is the walking group, there's swimming, a lot of guys are into swimming at the moment. I'd really like to see more of the women involved, that's umm- actually quite a few of the women are coming to circuits at the moment, which is lovely, but I think umm, there's-there's work to do there.

I: My last kind of question-

P8: -I will say, that circuits are really popular and it's something that staff get involved in as well and that works really well, that's actually nice. And football for similar reasons, the patient's kind of enjoy seeing the staff struggle as well and puts them more on an even level y'know. And some of our staff are overweight too y'know so it kind of shows it's not just another thing that has come as the result of having mental health problems and that it's something that many many people struggle with

I: If you had a magic wand, what would you implement or take away that could fix the problem?

P8: (Laughs), I honestly don't think we've found the solution yet. I'm not sure there is one. I haven't seen any, umm, I would, I would get more fresh food in, I'd have more umm, proper cooking lessons umm, and maybe communal- cooking of communal meals from scratch. I think that would improve diets, I don't know if it would solve the problem.

-- End of interview --

Appendix R

Study 3 Transcript 9

I: So the first question that I am asking people is what are their general thoughts are regarding the physical health of patients here at Caswell…

P9: Well it's clear that people put on weight when they come into the clinic and I guess it's for varying reasons. We don't often see people lose weight and I think that there's -there's a number of reasons for that; there's medication that gives you the munchies and of course it's not the medication alone is it, it's a, it can give you the munchies ummm I think there's probably a lack of motivation for some people isn't there you know you find yourself in a place or in a situation you don't want to be in, you don't think you need to be here umm, and that can go one way or the other, people will either will, ummm control their eating or they'll just eat those meals available, we can find that probably with lots of our patients that we can't look after themselves well, if they've come from the community particularly rather than a hospital and suddenly there's 3 meals a day and snacks in between and there's the café shop, so there's access to good food on a regular basis and I know particularly there was one of our ladies who wasn't looking after herself in her flat before she came into the system, so, and she's put on quite a bit of weight, there's a lot of comfort eating, there's a lot of eating your emotions, y'know, it's what happens

I: Just wondering, speaking from your area, if there's anything you can say about the development of the person, the way they've been brought up for example?

P9: I think, you know, in some areas that are deprived you'll have some people who live on fast foods, chips, y'know just and not necessarily follow a healthy eating plan as to what is actually nutritious for the body

I: Are there any thing that the service should be doing more of?

P9: Well we've got a dietician that will visit, umm, and ward staff are very encouraging and all very aware y'know I mean a lot of our staff on our ward they're all healthy so they know what works and doesn't work so I think education wise it is freely available it's the will of our patients to make sure.. yeah

I: So, what are your thoughts on being in a secure service and the potential for gaining weight?

P9: Restrictions… yeah probably I mean what else is there to do, in some cases, even though there are activities in the clinic and it's about motivation- food is a big comforter for people who probably never had much of it, it's good food in the clinic so you know it's access to good food and it's comfort

I: Ok, umm, are you aware of any weight loss initiatives that the service has offered for patients?

P9: We've got wellbeing groups ummm, from a physical point of view there's lots of walking groups, there's lots of gym sessions and so on, swimming so lots of things provided from an

exercise point of view uhh but actually from eating I'm not sure about the educational side of things apart from on-going conversations and that doesn't mean they aren't here it's just that I am not aware of them.

I: Have you always worked in secure services?

P9: No no I've worked in all sorts of mental health settings

I: Ok and were the issues the same there as well?

P9: Not in the community, massively different but in other secure services yes.

I: Ok, I've discussed with people around the clinic about the weight that patients lose when they leave the clinic…

P9: Is it all they've got to control here is what they eat? Whether it's excessive or not, that's the only control they've got unlike in the community and it's instant gratification

I: the last kind of question I've been asking people is if you were to have a magic wand, what would you take away or implement to reduce the problem?

P9: As I am not aware of education, I think I would probably put a bit of a focus on that, about the dangers of weight, y'know we've got a lot of substance misuse groups and there's a lot of work done with that, I don't know how much work- it's sensitive isn't it? More sensitive than substances… people get embarrassed.

--End of interview--

Appendix S

Study 3 Transcript 10

I: So the first question I have been asking people is what their thoughts are on patient physical health in the service...

P10: Well, it's not a massive secret that the patients we have here are seriously overweight like, umm, you see them come in sometimes quite normal size but then after a few weeks you start to see them balloon which is quite sad because they are- they have so many other things going on like you think well now they have to deal with being overweight as well now. Not going to help things is it like...

I: That's interesting – is it mainly when they are newly admitted that you see the weight become a problem?

P10: Most of the time yeah, but of course then we have people who come in that are also overweight and we kind of assume, based on where they have come from, that the problem started there like you know. If they have come from another secure service, then they are usually still pretty big when they come in like but even so they will still gain weight when they are here like

I: And what do you think it is about this place specifically, and secure services in general, that contributes to patients gaining weight?

P10: Pfft well... you want to see how much the fellas eat for a start. They get meals provided for them right and then you see them snacking all evening and then we have takeaway nights and some people are spending £30+ on food for themselves, it ridiculous. You look at the snacks they are eating as well, it's not as if they are eating lettuce for a snack some of the guys are eating multi packs of crisps in one go like. Sometimes they are even snacking straight after breakfast or they haven't had breakfast so then lunch is their breakfast and then they are only having two meals for the rest of the day and it's just not enough for them. What else uhhhh, exercise... most of the boys don't do regular exercise, they get access to the gym and stuff, but they just don't fancy it, or they aren't awake or whatever and then they are just sitting around all day waiting for the next day. And we do try and get them going you know it's not as if we want them to sit around and get fat but it's hard to make someone do something they don't want to do. It's hard then because when we have a party or whatever, and this goes back to the food thing again, we have like treats and stuff because someone is leaving say, and then we are eating the food so we can't exactly not let them have any or stop them from eating it because they are too big so. The ward is so small and feels so restricted so must be really hard in fairness

I: So a bit of too much eating and a bit of too little exercise?

P10: yeah a bit of both like...

I: Ok, so the foods that patients are provided for by the service, what is that like?

P10: Yeah it's nice to be honest and some of the boys really like it

I: Would you say it was healthy

P10: I mean yeah it could probably be healthier for the guys we have at the size that they are but overall, I'd say that they hit all the nutrition stuff like, you know? They had jacket and tuna the other day for example which is good for you isn't it?

I: yeah, absolutely, if you are living a moderately active lifestyle tuna for protein and jacket potato for carbohydrates but if they are having the tuna with mayo and the jacket with butter and they aren't exercising it probably isn't that healthy

P10: Ah right yeah well they don't all have the butter but to be honest most of them do and when they haven't got much else going for them in here y'know they are stuck in here pretty much adding little things to your life to make it that bit easier is probably ok for them y'know

I: So any other factors you think may be contributing to their weight gain?

P10: uhhhh (long pause), not that I can think of really...

I: And have there been any initiatives or things done by the service to help tackle the problem?

P10: Yeah so, we have like walking groups and stuff, some patients can go swimming and use the gym but like I said they just don't want to most of the time. Some patients really are motivated to do stuff but majority of them don't fancy it like.

I: ok so you mentioned a lack of motivation, let's go a bit into that... why do you think they are not particularly motivated?

P10: well if you were stuck in hospital and felt you were fine you would probably feel unmotivated too

I: Fair enough, but what is it about 'being stuck in hospital' that is unmotivating

P10: well they don't get to see their family, they don't see their friends if they have any, they can't go to the shops or the pub or anything like and they don't know exactly when or if they are leaving the place like so must be quite unmotivating. If they are already really big as well like it's really hard to motivate yourself because you think well I'm not gonna see a difference for ages so what's the point like I know I've felt that about myself and I don't have mental health problems you know..

I: Yeah it really does sound tough

P10: It really is

I: ok so what do you think the service could do more of to tackle the problem?

P10: Ummm I think maybe ban takeaways and snacking and stuff, maybe more walking groups or more things to do so they are just sitting around you know

I: Ok and last question – if you had a magic wand, what would you do to make this problem go away?

P10: Besides just making them a healthy weight?

I: Yes, because they could regain the weight, couldn't they? If some were a healthy weight before admission and then weeks and months after they are overweight...

P10: Uhhhhh (long pause) I'd have to say stop takeaways because the amount that some of the boys eat it's honestly ridiculous, I wouldn't spend that amount of money for my partner and my kids combined and they are doing that for themselves like you know

I: Ok you've been great, thank you so much for your time

-- End of interview --

Appendix T

Study 3 Transcript 11

I: So, physical health in the service, what are your thoughts on it?

P11: Like generally or?

I: Yeah: good, bad, any particular problems?

P11: Umm, so patients don't always do a lot of exercise, so I'd say they are quite unfit, most of them are obese particularly the women although obviously there are more men than women umm, yeah...

I: So, do you notice people gaining weight in the service or are they already big when they come in?

P11: Bit of both to be honest. They definitely gain weight when they come into the service and you find that the thinner ones gain the most noticeable amount. The weight gain seems to happen quite rapidly but then carries on a bit slower than when it first happens like.

I: Ok and why do you think that patients are gaining weight?

P11: I think their lifestyles are just so sedentary that whatever they are putting in their mouths is staying on their body's. That's not to say that what they eat is always really healthy though because some of them eat obscene amounts of foods especially when we have takeaway days. On leave as well you find that patients always want to centre their leave around having coffees like lattes and fattening coffee things or going to food places and stuff or they can even order food online now on the ward which they [the service] have tried to cut back on the amount the can actually order-

I: - in what way are they cutting back?

P11: So, like they have said you can only buy like 5 items now or something, but then patients will get around it by buying like one 6 pack of pringles or whatever, so it only counts as one item like.

I: Ah right ok, so patients aren't moving very much?

P11: no exactly, we have a gym, grounds and stuff but patients don't always use the gym and the timings for the gym are always a bit of a pain because like you have to have staff with patients and if we are short staffed then it just doesn't happen or if they have therapy sessions booked in or whatever they may miss the gym slot like. Some patients have grounds leave so they can have a walk around the grounds but some of them don't even use it because they can't be bothered. Lots of the patients I've worked with sleep a lot as well, like they will stay up really late and then not even get up until after lunch

I: so they are missing lunch then as well?

P11: exactly yeah, umm so yeah, they won't have breakfast or lunch so they have to wait for tea but in the meantime, they will have some food and then they are playing catch up all evening then trying to eat everything they can lay their hands on like

I: So, it sounds like eating is the biggest problem, what do you reckon?

P11: Well, yeah, the eating is really bad, but if they moved y'know they could at least maintain their weight or even lose a bit like.

I: What are the meals like that are provided for patients?

P11: Not great to be honest, I wouldn't eat it

I: in what way?

P11: it's just like bland and boring, definitely wouldn't say it was particularly healthy either

I: Do the patients enjoy?

P11: some do, but mainly they are unenthusiastic about it like it's the same stuff every week.

I: Ok so it sounds like perhaps the ward environment is having a big impact on patients' weight, would you say?

P11: Oh definitely. Definitely. Definitely. I think if the ward was bigger, less hospital like and less rigid with its routine then patients would feel up for getting up earlier, going out more and doing more exercise. Instead they are sedentary and eating a lot.

I: Ok, so what other contributors are there do you think to their weight gain

P11: uhh, well they are pumped full of medication so that's going to have an impact, the emotional eating for being depressed and mentally ill and stuff

I: You think they may console themselves by eating?

P11: Definitely. Other than like playing the playstation or whatever they get very little feelings of pleasure like so having a bag of crisps is probably like a nice hug or something them you know?

I: That's really interesting – do the service try anything to help them with their weight problem?

P11: Yeah so OT do have loads of stuff going on, the OT techs are doing classes all the time, we've got a big gym for like circuits and stuff, walks, leaves to town, leaves to the garage – although they usually buy junk [food] from there, we have a physical health nurse specialist too who tells us a lot of stuff

I: Ok so what about staff on the ward?

P11: Well to be honest the ward is always pretty busy so there's not always a lot we can do other than like offer alternatives to bags of crisps or we can tell them maybe they don't need the second or third bowl of cereal and we are meant to not like eat junk in front of them but when you have a long shift a few biscuits with your cuppa can go a long way you know. We have parties as well sometimes and the patients have cakes and stuff, there's bake sales sometimes and we have like breakfast mornings and stuff and it's never particularly healthy you know. To be honest though because I work on a quite a difficult ward we are more concerned with making sure the patients are settled and stuff plus I think the nurses deal with that kind of stuff more than us because I'm only health care y'know?

I: Ok, well it sounds like your days are pretty busy. Do you think that the service could be doing more?

P11: Ummmm, yeah but I'm not sure what umm, maybe get better food for the patients or like stop having so many takeaways or whatever. The patients that get up at a normal time will have breakfast, lunch and tea all within like 9 until 4 like so 4pm until they sleep, they are obviously going to snack aren't they, I definitely would.

I: Ok interesting. So, if you had a magic wand and you were asked to stop the weight gain problem, what would you do?

P11: ummm, a wand (laughs) I'd give them more time to have exercise or more opportunities and maybe stop them from eating rubbish

I: You mentioned a minute ago that there are quite a few things for them to do to be active, why do you think they are still gaining weight?

P11: I just don't think the patients want to, like they can't be arsed y'know. And that's not everyone, some patients are brilliant and really active and love the gym and circuits and stuff, but like sometimes staffing problems or the patient just isn't up for going because they've had a hard day or just generally are unmotivated

I: Why do you think they may be unmotivated?

P11: I think just like being here [on the ward] and stuff, like boredom and just like generally sad and a bit blah y'know?

I: ok that's all so helpful, thanks for your time!

-- End of interview --

Appendix U

Study 3 Transcript 12

I: So basically, I've been asking what people's thoughts are on the physical health of patients here in the service... what are your thoughts on the matter?

P12: Well there's only a handful that have, actual, diagnosed conditions, there's a few people with asthma, a few with type II diabetes, ummm, but I think, their attitudes vary. Some of them have no interest in looking after themselves umm, you know with regards to diet or smoking or exercise, they just, they don't care and they use that as a form of self-harm in a way and then there's other ones that want the attention that a physical health problem can bring with it-

I: So they can see a physician or something is it?

P12: Yeah so they-they just want that reassurance that everything is ok so umm, so one patient who goes into urinal retention will be catheterised every now and then and I think sometimes she likes that extra attention that she gets because of having a catheter and having to have that extra input from the nursing team and from ourselves so yeah there's, there's two elements that umm, obviously with people who are on anti-psychotics and things like that there are a lot of physical health side-effects – that's obviously a big part of it and obviously blood monitoring and things uh is also a big part of it, and for a lot of them it is worse because their lifestyle is worse and they don't really listen to advice so-

I: Is umm, is this the first secure service you've worked in?

P12: Yeah, it is yeah

I: So, what are your thoughts on the weight gain problem specifically in secure services?

P12: There is a problem definitely umm and being on the medications that they are on is an element to it and also their lifestyle so they may not be as active as they would be in the community and also their diet may not be as good uhh because, they might eat more because they are just that bored or a lot of them are smokers so for a lot of them their smoking is going to be restricted so they are eating more to make up for that umm, yeah it is a massive problem and we do have the other side, the ones that restrict their eating because of control issues or to do with eating disorders or self-harm to not eat umm yeah I think weight gain is a massive problem

I: Ok so people often say that antipsychotics are the key problem but are there any other things you would say are as key as their medication?

P12: Umm I think eating lots, because they don't really have much to do, it's hard for me to say because I am not on the ward all the time, umm, I've gone through some of the food charts and there's lots and lots of snacks or some people having some- lots of drinks and I'm not sure if that's just something to do to kind of keep them busy on the ward uhhmm-

I: How restricted are they on the ward in terms of food?

P12: Uhhh well they have three meals a day, they can ask for more if they want more and uhh they have snacks as well like yogurt, fruit uhh, yeah I don't actually see it first-hand but I just kind of get the report- like the food charts but that's only for the ones that have problems so it's the extreme end umm

I: Do you know how it works when they serve the food? Like do they have set times?

P12: I know that they have breakfast, lunch and dinner I'm not sure about the snacks in-between, I think it depends on their kitchen access so some patients will have more kitchen access because their risk is lower so they can go and help themselves to tea and coffee uhh- I'm not sure what they have in the kitchen it would probably better to speak to someone on the ward actually because they will know a bit more about what they have access to uhhm yeah I'm not sure because I don't see it first-hand but I think its uhh- they have a lot of time and I think anyone who spends most of their time sat around would eat things

I: yeah and if they are in a place that they may not find particularly pleasant, they don't have massive amounts of contact with their family, they don't have access to the pleasures associated with the outside world and stuff they have these things that allow them to feel very nice very quickly [food] umm.. so how long have you been in this service?

P12: Uhh probably just coming up to two months now…

I: Do you know of any initiatives that are aimed at targeting the physical health stuff?

P12: Well they have to have physical health checks every six months which includes bloods and we assess various things with that and like if they have high blood pressure or type II diabetes they'd be started on a statin to counter it umm, but yeah the actual kind of lifestyle changes, the diet, the exercise- there is the exercise obviously with OT and they do it in groups and we encourage them to walk, but yeah we just kind of identify these things and monitor them and what's actually been done on an activity level, it's not like a specific thing that we do, I mean for some people if they are extreme like we have one patient whos was quite obese, we changed her diet plan and its quite strict in terms of what she can eat but until they've got to that point there is no kind of strict guidance on what we should be eating but obviously they certainly could eat better

I: So are there any things that the service could be doing more of?

P12: Uhh maybe, well obviously there's been these issues with access to the gym umm-

I: For the patients that haven't been here that long or?

P12: Yeah I mean they haven't had gym inductions but it's been like a logistical thing like staffing and stuff which has been the problem, yeah, so its more logistics in terms of who can do the inductions uhh and I think a few of them might be registered with a local gym but then obviously they've got to be able to have their leave to go to the gym umm, and I think some of them are unaware that they can do that umm I'm not really sure umm you know people could be going walking rather than smoking but at the moment they just use their leaves to smoke, whereas they could be doing more exercise or encouraging them not to smoke- that

would be really good and we are trying to get in touch with stop smoking Wales to see if they can help people quit but yeah sorry what was the question?

I: So what could the service do more or less of?

P12: Umm, I think smoking would be really really good, I think last time when they come in- when they come in they really- they don't have leave but they might have been smoking 20 a day they come in they stop smoking straight away but obviously they have lozenges, they have nicotine replacement but their main aim then is to get leave so they can smoke whereas they might have gone a month in here without leave, without smoking and you sort of say to them actually you're probably not going to crave nicotine anymore you know this is a good time- if you were ever going to stop smoking this would be a good time it's a whole month without- so you know it's kind of identifying those times for when it's good for people to stop smoking umm, yeah and I can't think of anything else

-- End of interview --

Appendix V

Study 3 Transcript 13

I: So tell me what your thoughts are on the physical health of patients here at [service name removed]...

P13: Honestly, it's not good you know, we have patients who are morbidly obese here and not just one or two of them. Because of that they have diabetes, cardiovascular diseases which means they are on meds to treat these symptoms which is obviously never good. I honestly can't see the problem getting any better either if I am honest like it's good they have people like you doing research on it but really, it's such a huge problem I just can't see how it could be changed

I: well hopefully I will contribute a small part at least to combatting the issue and with your help here. Why are patients gaining weight then?

P13: Medication is a big thing, some of the meds they are on definitely cause some of the weight gain for sure like the antipsychotics and stuff you know and whether it actually causes them to retain more fat or whether it causes them to be constantly hungry I couldn't tell you but whatever it is it's a really big problem and like I just can't see why something isn't being created to tackle it because surely it's going to be costing the government more to treat the patients who become obese than it is to keep people well like you know. I think there needs to be a big change in the medication, like they could create a new drug or use combinations of drugs like they do now but more effectively. If I'm honest and without being offensive I think that's probably what they should be focusing their research budgets on because we know the medication is the big thing. And the reason I'm so angry about it is because I have to give these patients their meds and I know that it's contributing to their weight gain problem, which in turn is effecting their physical health and their mental health, like how can we expect people with really serious mental health issues to get better if they don't have a positive self image, you know? It baffles me honestly.

I: First off, no offense taken, I'm not really funded by the government and whilst the research does suggest that meds are a big contributor, some studys suggest there may be other things at play which is why I'm here essentially-

P13: -no yeah that's right to be fair, it's not just the drugs obviously but it's a massive part of it and a part I feel strongly about because I have to give these meds to the patient knowing full well what they do you know, like I'm partly accountable for it you know

I: Yeah it must be really tough knowing that but I guess the meds do eliminate a large element of suffering for the patient

P13: yeah definitely

I: So, meds are a big thing (both laugh), what else?

P13: Well the amount of food they consume is silly and the quality, crap, crap, crap is all they eat like and it's from morning until bedtime for some of them. They have lunch and dinner

provided albeit it's not great, but you know it's a proper meal, but they are still stuffing their faces with snacks and stuff throughout the day and night. It doesn't help then that they got a take away every week then that is a massive deal for some of the patients and we are like just allowing them to have them you know it's a bit like the medication thing like we can't stop them so we are almost facilitating it in a way

I: What about the amount of activity they do?

P13: There's a gym here which is quite good and the OT techs are pretty good like but then people don't always want to go or the times don't suit or we need to close off the ward you know so it's not as straight forward for patients just to go to the gym like you know

I: So the restrictions and nature of the ward makes it difficult

P13: Yeah absolutely like they are stuck on the ward most of the day and there's a bowl of fruit on the table but you know they aren't looking at that all day thinking I want a piece of fruit they are thinking I'm bored I want something nice so they have a whole bar of chocolate that they've bought or crisps or whatever

I: Do you think patients want to be overweight?

P13: No not at all, but I think that patients struggle to really give a shit about going to the gym or have such low self-worth that they will think what's the point in eating healthy or not binging when I could eat 5 packs of crisps now and feel great for 3 minutes you know. It's really really sad and it's a hard thing to see as a nurse who works to make people's lives better you know

I: What things could the service do more?

P13: Ummm, they need to stop allowing them to feed themselves crap, stop takeaways stuff like that

I: and what kind of initiatives have been used to try and help the problem?

P13: Ummm, they've uh, had the, what's it called? The weight management group thing but that was hit or miss like, they've tried to put healthier food in the tuck shop, but patients are still buying three, two litre bottles of cherry-ade or whataver so whatever they are doing it's not enough really. I think they need some more psychology input or whatever you know like a healthy eating intervention or some sort of diet-based therapy you know

I: Yeah that's a good idea, there are some interventions that have been made for people in secure services as well-

P13: -well they need to bring it in here

I: What sort of things do you think the psychological interventions should focus on?

P13: ummm, self-esteem, umm (long pause) yeah better self-esteem and like other ways of coping with bordem or negative feels and stuff, improving their motivation to be healthier but then they would need to have a better self-esteem first before that you know,

I: And this is sort of a weird question, but if you had a magic wand what would you do to stop or assist with the problem?

P13: ooo lots of things [both laugh] but I think I'd develop a drug that wouldn't make them fat but also help with their mental health because I just think it's such a massive problem. We are going to be in a position where we have a service where 100% of the patients are morbidly obese and we are not trained as psychiatric nurses to deal with the amount of physical health problems that we would have to deal with. We need to be focusing on their mental health needs and stuff that's what our job is and there needs to be more physical health people involved

I: Excellent, thank you so much [name removed] for your time it's really useful ta

-- End of interview --