

University of Chester



This work has been submitted to ChesterRep – the University of Chester's
online research repository

<http://chesterrep.openrepository.com>

Author(s): Peter McCrarren

Title: Nutritional knowledge of mental health nurses working in the Irish Forensic
Mental Health Service

Date: September 2013

Originally published as: University of Chester MSc dissertation

Example citation: McCrarren, P. (2013). *Nutritional knowledge of mental health
nurses working in the Irish Forensic Mental Health Service*. (Unpublished master's
thesis). University of Chester, United Kingdom.

Version of item: Submitted version

Available at: <http://hdl.handle.net/10034/316213>



University of
Chester

Department of Clinical Sciences and Nutrition
MSc Exercise and Nutrition Science

Module Title: Research Project
Module Code: XN7523
September 2013

Assessment Number G23794
Word count: Review Paper 4848
Word count: Research article 4381

Declaration of academic integrity

This paper is original and has not been submitted previously in support of a degree qualification or other course.

Signed: Peter McCrarren

Date: 15 September 2013



Acknowledgements

I would like to sincerely thank Dr. Stephen Fallows for his constant support, help and advice throughout the entire duration of this research project. I would also like to thank the staff at the Central Mental Hospital for agreeing to participate in this study.

A special word of mention to my wonderful wife Krystle and my mother Maureen for their patience, understanding and tolerance over the past two years as I have abdicated on several duties and responsibilities required of me and postponed numerous other projects until the completion of this course.

Table of Contents

Declaration of academic integrity	2
Acknowledgements	3
Abbreviations	8
Abstract	9
Chapter 1 Review of the Literature	
1.1 Introduction	11
1.2 Prevalence of overweight/obesity within mental illness.	13
1.3 Overweight/obesity and forensic mental health services	15
1.4 The role of nurses in patient education programmes	17
1.5. Nursing led interventions to improve and promote healthy eating behaviours	18
1.6. Nurses' nutrition knowledge	20
1.7 Dietary habits among mental health patients	22
1.8 Role of psychiatric medications in causing obesity	24
1.9. The effect of psychiatric medication on bodyweight	25
1.10 Strategies to reduce medication induced weight-gain	27
1.11 Weight gain in medication-free patients	29
1.12 Comorbid physical health conditions with mental illness	30
1.13. Health outcomes for patients suffering with Severe Mental Illness	31
1.14 Conclusion	33
Chapter 2 Research report	
Word Count and Key words	35
2.1 Appropriate journal for publication of this study	36
2.2 Abstract	37
2.3 Introduction	38
2.4 Hypotheses	39
Chapter 3 Methods	
3.1 Participants	41

3.2 Study design	42
3.2.1 The questionnaire	42
3.2.2 Statistical Analysis	43
Chapter 4 Results	
4.1 Sample	45
4.2 Nutrition knowledge of males vs. females	46
4.3 Nutrition knowledge by years qualified as a nurse	47
4.4 Nutrition knowledge by length of service working within the Irish Forensic Mental Health Services.	48
4.5 Nutrition knowledge based on age category	49
4.6 Nutrition knowledge by grade/rank	50
4.7 Nutrition knowledge and education level attained	51
4.8 Breakdown of the results in each section of the questionnaire	53
Section 1- Dietary recommendations	53
Section 2- Sources of Foods/Nutrients	54
Section 3- Choosing Everyday Foods	55
Section 4- Diet-Disease Relationships	55
Chapter 5 Discussion	56
Chapter 6. Limitations of study and recommendations for future research	58
Chapter 7. Conclusion	60
Reference List	61

Appendices

Appendix 1: Inclusion/Exclusion Criteria	79
Appendix 2: Copy of ethical approval from University of Chester Faculty of Applied Sciences Research Ethics Committee (FREC)	80
Appendix 3: Copy of email granting ethical approval to undertake study within the Irish Forensic Mental Health Service.	82
Appendix 4: Copy of email granting permission to use questionnaire from Professor Wardle	83
Appendix 5: Cover letter to potential participants	85
Appendix 6: Participant Information Sheet	86
Appendix 7: Questionnaire	89
Appendix 8: Original General Nutrition Knowledge Questionnaire for adults with correct answers	103
Appendix 9: Amendments made to original General Nutrition Knowledge Questionnaire For Adults	108
Appendix 10: Mean Nutrition knowledge Score and Standard Deviation	110

List of Tables

Table i: Number of nurses in each nutritional knowledge category	45
---	----

List of Figures

Figure i: Nutrition knowledge of males vs. females	46
Figure ii: Nutrition knowledge by years qualified as a nurse	47
Figure iii: Nutritional knowledge by length of service working within the Irish Forensic Mental Health Services.	49
Figure iv: Nutrition knowledge based on age category	50
Figure v: Nutrition knowledge by grade/rank	51
Figure vi: Nutrition knowledge and education level attained	52

Abbreviations

BMI	Body Mass Index
CHD	Coronary Heart Disease
CNM1	Clinical Nurse Manager 1 (Deputy ward-manager)
CNM2	Clinical Nurse Manager 2 (Ward-manager)
FMHS	Forensic Mental Health Service
GNQ	General Nutrition Knowledge Questionnaire
GPRD	General Practice Research Database
IFMHN	Irish Forensic Mental Health Nurses
IFMHS	Irish Forensic Mental Health Services
Kg	Kilogram
M	Meter
SD	Standard Deviation
SMI	Severe Mental Illness

Mental Health Nurses' Knowledge of Nutrition

Abstract

Purpose: This review assessed the relevant literature relating to mental health nurses knowledge of nutrition. It also examined the incidence of obesity within the sphere of mental health care, and the relevance of the nurses' role in educating and advising patients on their diet.

Method: The search of the literature utilised the following databases; PubMed, Wiley Online Library, ScienceDirect, and Elsevier. The search strategy employed key terms such as; "mental health/psychiatric nurses nutrition knowledge", "nurses diet", "mental health diet" and "mental health obesity" As only a few studies were attained in the forensic arena, a more generalised search was also incorporated and relevant papers were acquired. The database searches were confined to literature published since 1998.

Results: This review revealed a paucity of literature on the subject of mental health nurses knowledge of nutrition in the forensic services. The alarming prevalence of obesity with those suffering with severe mental health issues was also observed. The side-effects of medication and many of the negative symptoms commonly found in mental illness, such as avolition, make it difficult to motivate patients to eat a healthy diet

Conclusion: More effective strategies are required to ensure forensic mental health nurses have the necessary skill and knowledge to adequately and appropriately advise patients on their diet.

Chapter 1. Review of the Literature

1.1 Introduction

Studies such as Fagiolini, Kupfer, Houck, Novick and Frank (2003) and Dickerson et al. (2006) have shown that overweight and obesity is particularly prevalent among those suffering with mental illness. This can be especially problematic for persons suffering with a mental disorder incarcerated in secure forensic mental health hospitals as various physical, legal and institutional barriers within these institutions prevent them from accessing physical activity and nutrition opportunities that are available in the general community (Wilson 2008). For example, The State Hospital Board for Scotland (2011) reported that over 80% of patients being treated at the main high secure forensic mental health unit in Scotland were overweight or obese.

This literature review will commence with an outline of the pertinent studies on the rates of overweight and obesity in individuals with severe mental illness (SMI) in comparison with the general population. The review will then attempt to examine the prevalence of overweight and obesity specifically within forensic mental health services and to assess the impact that incarceration may have. As the nursing staff spend the greatest amount of time with the patients, this review will then focus on their role in advising and educating patients on their dietary intake and the potential

barriers or challenges that they may encounter. In order that nurses competently fulfil this role, it is necessary that this review evaluate various studies which have sought to examine the level of nutrition knowledge amongst nurses. Subsequently, investigations concerning the dietary habits of mental health patients will then be evaluated within this review. The impact of psychiatric medications on weight gain will also be assessed. Finally, the risk factors caused by being overweight and obese for this patient group will be discussed including the potential affect on their health, wellbeing and quality of life.

1.2 Prevalence of overweight/obesity within mental illness.

Increasing evidence suggests that individuals with a mental illness are at increased risk of being overweight (i.e., Body Mass Index (BMI) = 25-29.9 Kg/M²) and obese (i.e., BMI >30 Kg/M²) when compared with the general population (Citrome & Vreeland, 2008; Coodin, 2001; Pack, 2009; Petry, Barry, Pietrzak, & Wagner, 2008; Saarni et al., 2009; Wirshing, 2004). Various clinical studies have reported that those suffering with schizophrenia have a 2.8 to 3.5 times increased likelihood of being obese (Coodin, 2001; Citrome & Vreeland, 2008; Wirshing, 2004) while those with major depression or bipolar disorder have a 1.2 to 1.5 times increased likelihood of being obese (McElroy, 2009; Petry et al., 2008; Saarni et al., 2009). Various studies reveal that between 42-60% of individuals suffering with schizophrenia are obese (Coodin, 2001; Strassnig, Brar, & Ganguli, 2003; McElroy, Guerdjikova & Kotwal, 2006). In one of these studies, Coodin (2001) utilised a cross-sectional survey approach to assess the possibility that the patients with schizophrenia were at increased risk of being overweight or obese compared to the general population. Height, weight and BMI were measured in a group of Canadian adults receiving treatment for schizophrenia and compared with the BMI of the general population. Coodin (2001) found that adult men and women treated for schizophrenia were heavier compared to the general population. The average BMI in the study sample was 29.02 Kg/M², with the average for men and women being 30.02Kg/M² and 28.49Kg/M² respectively, compared to the average BMI of 26.3Kg/M² and 24.3Kg/M² for men and women in the general population. The prevalence of obesity in this cohort was 3.5 times higher than the general

population. Dickerson et al. (2006) compared 169 randomly selected outpatients diagnosed with a SMI and a gender-, race-, and age- matched group of 2,404 persons from the National Health and Nutrition Examination Survey (NHANES) III. The distribution of BMI in the psychiatric sample significantly differed from that of the comparison NHANES group; 50% of women and 41% of men from the SMI group were obese compared with 27% and 20% in the comparison NHANES group (Dickerson et al., 2006). Similarly, an analysis of 86,028 subjects in a health management organisation data-base conducted by Sicras, Rejas, Navarro, Serrat and Blanca (2008), showed that patients with bipolar disorder had a higher rate of obesity (41%) than those without bipolar disorder (27%; $P = .002$). McElroy et al. (2002) suggested that up to 68% of people seeking treatment for bipolar disorders are overweight or obese. Simon et al. (2008) found that 57.8% were obese from a sample of middle-aged women with moderate to severe depression.

1.3. Overweight/obesity and forensic mental health services

Among long-term forensic mental health patients, Cormac, Martin and Ferriter (2004) found that their propensity to gain weight is accelerated, and programmes to address overweight and obesity through exercise are compromised by the secure environment. In a subsequent study, Cormac, Ferriter, Benning and Saul (2005) assessed the physical health and health risk factors among long-stay patients at a high security forensic mental health hospital in the UK. 36% of male patients and 75% of female patients were obese. More importantly, the researchers found that the patients mean waist circumference increased and there was corresponding mean increase in weight of 10.62 kg in males, and of 12.74 kg in females, during their period of hospitalisation (Cormac et al. 2005). High levels of obesity, especially amongst female patients were observed in another study conducted by Haw and Rowell (2011) at a different U.K. forensic mental health hospital. A cross-sectional survey of 234 patients (144 males and 90 females) found that 63 per cent of female and 47 per cent of male patients with SMI were obese (Haw & Rowell, 2011). This compares with 24 per cent of adult males and 25 per cent of adult females classed as obese within the general U.K. population in 2008 (Craig, Mindell, & Hirani, 2008). Although these high levels of overweight/obesity identified in FMHS in the above studies are alarming, Wilson (2008) acknowledges that it can be difficult to address the rapid weight gain often observed in patients incarcerated, due to various physical, legal and institutional barriers preventing them from accessing information resources that are available in the general community. Also, within these secure settings, patients may have restricted access to fresh air and exercise due to their unstable mental

state/unpredictable behaviour or insufficient staff to escort them off the unit (Haw & Rowell, 2011). Furthermore, many of the current pharmacotherapies, including the second-generation atypical antipsychotic drugs can cause dramatic increases in patients' weight (Cope et al., 2005).

1.4 The role of nurses in patient education programmes

Patient education is the process of influencing patient behaviour and producing the required changes in knowledge, attitudes and skills necessary to maintain or improve health (American Academy of Family Physicians [AAFP], 2000). In most situations patients are suffering from ill-health due to poor dietary control caused by a lack of sufficient knowledge about the diet they eat (Waśkiewicz et al. 2008). Forsyth, Elmslie and Ross (2012) suggest that nurses are widely regarded as a highly credible source of health information, and the continuous verbal and social interaction between forensic mental health nurses and their patients portrayed by Rask and Levander (2001), provides an excellent opportunity for nurses to address the problem of overweight and obesity. In a study at a forensic mental health unit in New Zealand, Forsyth et al. (2012) found that the nursing staff considered that patients in their care lacked basic knowledge about food and nutrition due to their upbringing, socioeconomic status, culture, education, mental illness and the impact of becoming institutionalised. Nutrition education should be recognised as a foundation of mental health interventions in clinical practice guidelines and standards of care (Davison et al., 2012). Forsyth et al. (2012) suggest that forensic mental health nurses provide simple, practical information to their patients and foster an environment in which the staff and patients can learn together. Therefore, mental health nurses should be equipped with the appropriate knowledge and understanding of eating a healthy and appropriate diet to help address the seemingly inexorable prevalence of overweight/obesity within patients suffering with SMI.

1.5 Nursing led interventions to improve and promote healthy eating behaviours

Smith et al. (2007) believes that mental health nurses are in a pivotal position to lead and promote healthy lifestyle adjustment in patients at risk of developing dietary related chronic diseases. Various nurse-led interventions have been found to be an effective model for patient education and improved health outcomes in patients with coronary heart disease (Allen et al., 2002), diabetes (New et al., 2003) and obesity (Ross, Laws, Reckless & Lean, 2008). However, within the forensic mental health setting, the nurse may face challenges in trying to address the problem of overweight and obesity (Scott & Happell, 2011). Forensic patients have also been described as particularly unmotivated and difficult to engage in daily programmes (Wilson 2008). According to Forsyth et al. (2012), forensic nursing staff reported that promoting an awareness of healthy eating practices and encouraging patients to apply their learning can be difficult and challenging. Additionally, many of the nurses expressed unease about the dilemma encountered in trying to balance their role of encouraging healthy dietary choices amongst their patients, with an awareness of their patients' right to autonomy and not taking too much control away from them by restricting their food choices excessively (Forsyth et al., 2012). However, Davison et al. (2012) recommend some specific nutrition interventions that can be specially adapted for mental health service users in order to maintain their independence and decision-making. These include healthy-eating education, food skills training (e.g., preparing, cooking, growing food), promoting nutrition literacy (e.g., develop easy-to understand nutrition labelling of foods), and development of nutrition and mental health educational materials (e.g.,

how to manage nutritional side effects of psychiatric medications, nutrition guidelines for specific conditions). As suggested by Haw and Rowe (2011), the introduction of obligatory training for clinical staff in healthy eating and lifestyle could further assist nursing staff to serve as positive role models and motivators for patients. This would enable simple, practical and easy to implement solutions such as having staff who are trained in healthy eating with their patients at the same table to model appropriate eating behaviour and create a more social atmosphere (Long, Brillon, Schell, & Webster, 2009). Indeed Forsyth et al. (2012) report that, nurses perceived the absence of any formal nutrition education as a major barrier to helping patients make healthier food choices.

1.6 Nurses' nutrition knowledge

Nurses are employed in all areas of healthcare, and therefore, this relative accessibility means that they are ideally placed to be providers of nutrition information (Schaller & James, 2005). Both Davison et al. (2012) and Forsyth et al. (2012) concur that all mental health professionals and health care/service providers working with mental health patients could benefit from increased knowledge of nutrition related to mental health as the level of nutrition knowledge amongst registered nurses can vary. Kobe (2006) undertook a descriptive study in which the nutrition knowledge of registered nurses working on a surgical ward in Kenya was investigated using a validated questionnaire. 63 per cent of the 160 nurses that were invited to partake responded. Kobe (2006) found that overall nurses' knowledge was weak, particularly in relation to basic and clinical nutrition. In another study, Schaller and James (2005) sought to determine the nutrition knowledge of a sample of Australian nurses using descriptive cross-sectional study design. The participants answered 48 multiple choice general nutrition knowledge questions (using a valid and reliable questionnaire) and provided educational and demographic details. The mean knowledge score for all nurses was 60.2 per cent (standard deviation (SD) = 8.4). Older nurses and those with more years of experience, and nurses with general training (rather than a degree) achieved higher average knowledge scores. The researchers noted that the nutrition knowledge score reported in this study is low to moderate by definition from previous studies using the same questionnaire (Schaller & James, 2005). In contrast, Hankey, Eley, Leslie, Hunter and Lean (2004) undertook a comprehensive study on nutrition on a group of 1,505 health professionals in Scotland. As part of this study, 509 nurses were questioned on

their nutrition knowledge. Nurses showed a high degree of nutrition knowledge in this survey with an average score of 84 per cent. Park et al. (2011) found that the mean correct-response rate for nutrition knowledge amongst nurses was 58.3%, in a study that sought to establish whether nurses have sufficient knowledge to impart appropriate nutrition counselling to patients pertaining to diabetes, obesity, and cardiovascular disease (CVD). As previously noted in Schaller and James' (2005) study, less experienced nurses and those that had a lower level of education achieved lower correct-response rates for nutrition knowledge (Park et al. (2011). The questionnaire used in this study had been slightly modified to suit the study population. Although the validity of the modified questionnaire had been assessed, its reliability was not tested.

1.7 Dietary habits among mental health patients

In patients with SMI, overweight and obesity is predominately associated with poor dietary choices and unhealthy eating practices (De Hert et al., 2011). Various researchers (Cormac et al., 2004; Haw & Rowell, 2011; Long et al., 2009; McCreadie et al., 1998) have all found that individuals with SMI frequently consumed a poor diet high in fat, sugar and calories. In their study, McCreadie et al. (1998) found that intake of saturated fat was higher than recommended among psychiatric patients and their antioxidant intake and ratios of serum vitamin E concentration to cholesterol concentration was low. They also consumed less than 2 fruit and vegetable portions a day; the current recommended average intake is two portions of fruit and three portions of vegetables a day (Centers for Disease Control and Prevention, n.d.). In fact, 83% of the patients consumed less fibre, 71% of the male and 69% of the female patients consumed less vitamin E, whilst 70% of the patients consumed more energy from saturated fats than the suggested UK estimated average requirements. Haw & Rowell (2011) observed that many patients consumed large quantities of confectionery, crisps, high calorie-carbonated drinks and take-aways in addition to the meals provided by the hospital. These items were purchased in the hospital shop, given to the patients by visitors or ordered from local fast-food outlets. Indeed, Cormac et al. (2004) found that confectionery was a common addition to the diet of long-stay patients and substantially increased energy intake. As part of a study by Long et al. (2009), the dietary composition of female patients in a forensic hospital in the U.K. was investigated. They report that on a daily basis; 50% of the patient population consumed one or more standard chocolate bars while 52% ate one or more bags of

crisps. On a positive note, 75% of patients ate one or more piece of fruit per day. However, 57% self-reported having two or more take- away meals per week (often in addition to meals provided). Long et al. (2009) also observed the typical food purchases at the hospital shop/ cafeteria by the female patients. They noted that 46% of patients purchased crisps or non-diet carbonated drinks, 36% bought chocolate, 25% purchased sweets and 21% chose chips. Only 1.9% of patients included any fruit in their purchases (Long et al., 2009). Brown, Birtwistle, Roe, and Thompson (1999) in a cross-sectional study assessing lifestyle factors in 102 community-based men and women with schizophrenia, found that no adult was consuming the recommended five or more portions of fruits or vegetables a day and that their diets were high in fat and low in fibre compared to the general population. Simon et al. (2008) discovered a significantly higher daily caloric intake (1831 vs. 1543) among middle-aged women suffering with depression. Interestingly this phenomenon was only observed in those subjects with a BMI over 30 Kg/M².

1.8 Role of psychiatric medications in causing obesity

The established potential of antidepressants and the emerging value of atypical antipsychotic medications in the treatment of various mental disorders are tempered by the well documented adverse effect of weight gain among users (Katzman, Jacobs, Marcus, Vermani, & Logan, 2007). According to Holt and Peveler (2009), the weight gain associated with the use of antipsychotics in people with SMI has led to them being classified among the most obesogenic drugs. After their review of 26 published studies including three meta-analyses, Schwartz, Nihalani, Jindal, Virk, and Jones (2004) reported that up to 70% of patients gain weight after being administered with antipsychotic medications. In a smaller but more recent review of the literature, Holt and Peveler (2009) found similar rates of weight among individuals after commencing on antipsychotic drugs (15%- 72%). The amount of weight gained ranged from 0 to 31 kg in psychotic patients when these drugs were used (Schwartz et al., 2004). In particular, several of the newer and commonly used second generation (atypical) antipsychotics, particularly, olanzapine and clozapine, are associated with substantial weight gain and metabolic syndrome (Newcomer, 2005), although earlier first generation antipsychotics are also liable to cause increased weight (Allison et al., 1999). The actual physiological mechanisms in how these antipsychotics cause weight gain is still not fully understood (Reynolds, Hill, & Kirk, 2006) although it is agreed that medication-related weight gain and obesity occur as consequence of drug-induced disparity between energy intake (type, amount and frequency of ingested calories) and energy expenditure (type, amount and frequency of activity/exercise) (Giskes, Van Lenthe, Avendano-Pabon, & Brug, 2011).

1.9 The effect of psychiatric medication on bodyweight

Foley and Morley (2011) undertook a systematic review of baseline and post treatment physical measurements in patients undertaking antipsychotic drug treatment for the first time. Twenty-five studies published over a 10 year period between 1990 and 2010 were included. Eight of the studies also included control groups that were recruited from hospital staff, universities, the general community, and a workplace-screening programme. Foley and Morley (2011) found that changes in weight, body mass index, and waist circumference were evident in the patients after just four weeks of antipsychotic medication. After ten weeks, there was a significant increase in subcutaneous and intra-abdominal fat. After six to twelve months, total body weight had increased by 10% to 12%. At the outset of the studies, rates of overweight and obesity ranged between 36% and 42%, but after 6 months, 58% to 71% of the subjects were overweight or obese. The researchers also found that patients who remained on antipsychotic medication continued to gain weight after this period. Similarly, Choong et al. (2012) noted weight gain ($\geq 10\%$ of initial weight) following drug treatment was found in 47% of these patients having received psychiatric medication for more than 3 months. The utilised a cross-sectional observational study with 196 patients and noted that the median BMI in the whole group was 27.9 Kg/M² (range: 24.2–31.4). Approximately 30% of patients were overweight (n = 59, 22% of women and 37% of men) and 38% were obese (n = 74, 32% of women and 43% of men). No significant differences ($p = 0.6$) were observed between patients taking mood stabilising medications and those taking anti-psychotics. Importantly for forensic mental health nurses trying to advise their patients

on diet and health eating patterns, Choong et al. (2012) found a strong correlation between self-reported appetite change and weight gain as more than half of 196 patients reported a change in their feelings of satiety following the introduction of their current treatment. The types of foods that patients are choosing to eat to satisfy their increased medication-related appetite has obvious implications on ward-based nursing staff having the necessary knowledge to advise them appropriately on their food intake (Shrivastava & Johnston, 2010).

1.10 Strategies to reduce medication induced weight-gain

According to Davison et al. (2012), there is a necessity to develop and implement nutrition education programmes for both mental health professionals and service-users in the identification of and treatment of nutrition-related side effects of psychiatric medications. A report by the Schizophrenia Commission (2011) proposed that healthy eating programmes should be introduced in conjunction with the commencement of anti-psychotic medication and run concurrently together to help alleviate the weight gain shown to be associated with anti-psychotic medications. For example, following the implementation of a six-month educational intervention on anti-psychotic related weight-gain, Littrell, Hilligoss, Kirshner, Petty and Johnson (2003) found that those who undertook the programme did not gain weight (-0.027kg) compared to the control group who gained 4.3kg. The researchers attributed the difference in the two groups to the acquired knowledge about healthy eating and lifestyle changes as part of the education programme. This study demonstrated that dietary and lifestyle changes introduced to schizophrenic patients could help to limit weight-gain induced by anti-psychotics. However, Ohlsen, Treasure and Pilowsky (2004) failed to detect any statistically significant weight loss in a weight-loss programme involving 44 participants receiving anti-psychotic medication. This nurse-led weight management programme involved individuals who were already overweight, and wanted to lose weight using dietary recommendation, exercise prescriptions and motivational interviewing. Overall mean weight loss was small (-3.1kg), but the majority of the group (72.7%) lost weight. The authors suggest that there needs to be a greater focus on prevention of weight gain by incorporating

healthy eating and lifestyle intervention programmes at the outset of drug-therapy (Ohlsen et al. 2004). The promotion of healthy dietary options among individuals with SMI is essential, not only as part of their recovery, but as a fundamental part of preventing metabolic changes and weight gain linked to their medication's side effects (Gibson, Carek, & Sullivan, 2011)

1.11 Weight gain in medication-free patients

Although it is widely acknowledged that many of the psychiatric medications have a major impact on obesity with individuals with SMI, sudden body weight fluctuations were also observed in studies during the early stages onset of the illness before medication was administered. Ryan, Flanagan, Kinsella, Keeling and Thakore (2004) reported that 17 un-medicated patients experiencing their first episode of schizophrenia had a significantly higher percentage of intra-abdominal fat than age- and sex-matched controls that were also matched for BMI. In another study involving medication- free patients, Maina, Salvi, Vitalucci, D'Ambrosio and Bogetto (2008), found that the prevalence of overweight in mood disorder patients is also influenced by the illness itself or related factors such as diet and life-style rather than the pharmacologic intervention. Almost 41% of the un-medicated patients with mood disorder were over- weight or obese compared with about 11% of patients with obsessive-compulsive disorder.

1.12 Comorbid physical health conditions with mental illness

Ample research evidence has demonstrated that morbidity and mortality rates are higher in individuals suffering with SMI than in the general population (Cormac et al., 2004; Cormac et al., 2005; Eldridge, Dawber, & Gray, 2011; Osborn et al., 2007; Phelan, 2001). From their comprehensive review of the evidence, De Hert et al. (2009) estimated that this mortality gap translated to a 13-30 year shortened life expectancy in SMI patients. This has widened in recent decades, even in countries where the quality of the health care system is generally recognised as being good. Although, a matrix of factors contribute to the poor physical health of people with SMI (Lawrence & Kisely, 2010), the increased rates of morbidity and mortality evident in this population is primarily due to a higher prevalence of modifiable risk factors, many of which are related to individual lifestyle choices. Poor dietary intake, lack of exercise and the high prevalence of overweight and obesity within those suffering with SMI, is a primary causative factor in these high morbidity and mortality rates (Choong et al., 2012; Coodin, 2001; Dickerson et al., 2006; Haw & Stubbs, 2011; Pack, 2009; Shrivastava & Johnston, 2010). The risk of developing debilitating medical disorders associated with obesity are dramatically increased, including type 2 diabetes mellitus (Mental and Physical Health Platform, 2008), CVD (McElroy, 2009) dyslipidemia (World Health Organisation [WHO] 2004), hypertension (Bray, 2006), respiratory difficulties (Bray & Wilson, 2008), reproductive hormone abnormalities (National Institute of Health (1998) and certain cancers (e.g., colon) (Holt & Peveler, 2009).

1.13. Health outcomes for patients suffering with Severe Mental Illness

Using the General Practice Research Database (GPRD), Osbourn et al. (2007) conducted a large-scale historical cohort study comparing mortality rates from coronary heart disease (CHD), cancer, and stroke between a group of patients diagnosed with a SMI and another group that do not have a SMI. The GPRD is an anonymous database encompassing 741 general practices in the United Kingdom. Osbourn et al. (2007) found that people with SMI experienced a two-fold increase in CHD between the ages of 50 and 75 years. However, even more startling, they uncovered that those in the 18-49-age category had a three-fold increase in CHD mortality when compared to the general population. Mortality rates of stroke were 2.5 times greater in those under 50 years old and almost twice as high in the 50 to 75-years category. The magnitude of these differences did not change significantly after adjustment for smoking or poverty (Osborn et al., 2007).

CHD is the main cause of mortality among individuals with SMI (Hennekens, Hennekens, Hollar, & Casey, 2005; Brown, Barton, & Lambert, 2009; Casey et al., 2004; Laursen, Munk-Olsen, Agerbo, Gasse, & Mortensen, 2009; Bouza, López-Cuadrado, & Amate, 2010). Roshanaei-Moghaddam and Katon (2009) undertook a review of seventeen published studies that focused on medical mortality within those diagnosed with bipolar disorder. Only studies that involved at least 100 participants were included. The finding from this review demonstrated that the mortality risk for CHD was 35% to 250% higher among individuals with bipolar spectrum disorders compared to the general population. In a large Australian study (Lawrence, Holman, Jablensky, &

Hobbs, 2003), ischaemic heart disease was identified as the major cause of mortality in mental health patients. Goff et al. (2005) calculated that the ten-year CHD risk was significantly higher in male (9.4% vs. 7.0%) and female (6.3% vs. 4.2%) patients who have schizophrenia compared to controls ($p=0.0001$) (Goff et al., 2005). The above literature highlights that there is a need to address the physical health needs of these patients along with their mental health problems as these are generally higher than the general population

1.14 Conclusions

Ensuring that each individual patient's dietary and nutritional requirements are met is a central part of the nursing role (Bjerrum, Tewes & Pedersen, 2012). The accumulated data from the research suggests that SMI and obesity overlap to a clinically significant extent (McElroy, 2009). These high levels of overweight and obesity are further compounded by various factors within FMHS which place patients at a particularly high risk of overweight/obesity such as restrictions on freedom and movement and therefore little motivation to eat healthily and to exercise (Haw & Stubbs, 2011). Hence, it is important that this patient group can easily access informed advice and guidance on their dietary intake from the nursing staff. However, only one Australian study undertaken eight years ago by Schaller and James (2005) could be identified within this review as having attempted to assess the nutrition knowledge of the professional group that spends the greatest amount of time and has the most contact with this particular patient group. No further published research could be found and this has led to a gap in the literature as relatively little else is known of the nutrition knowledge of this specialist group of nurses. Furthermore, no study has ever investigated the level of nutrition knowledge amongst mental health nurses working with the Irish Forensic Mental Health Services. For this reason, it was deemed appropriate to conduct a study investigating the nutrition knowledge of IFMHN. Various other studies have examined the nutrition knowledge of nurses working within other disciplines and specialties. Although, nursing across all disciplines shares many core values and principles (Smith & McCarthy, 2010), the patient groups being treated are completely diverse and the nutrition knowledge required by nurses

working within FMHS is entirely different from the other areas of nursing that have been extensively researched.

Irish Forensic Mental Health Nurses' Knowledge of Nutrition

Word-count: 4381 words

Key words: Obesity, Psychiatric, Overweight, Diet.

2.1 Appropriate journal for publication of this study

As this study involves an investigation into the nutritional knowledge of Irish Forensic Mental Health Nurses (IFMHN), its findings may be published within the Journal of Psychiatric and Mental Health Nursing. This bi-monthly journal provides an international forum for the advancement of psychiatric and mental health nursing practice and publishes peer reviewed papers which reflect developments in knowledge, attitudes and skills and integration of these into practice international forum for the advancement of psychiatric and mental health nursing practice ([http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1365-2850](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1365-2850)). The publication of these findings can inform and add to the debate and discussion regarding the factors that can improve mental health patients' diet and nutrition.

2.2 Abstract

Purpose: This cross-sectional design study investigated the nutrition knowledge of Irish Forensic Mental Health Nurses (IFMHN). It was primarily hypothesised that IFMHN have a good level of nutrition knowledge.

Method: Following the application of various inclusion and exclusion criteria, all remaining nurses employed in the Irish Forensic Mental Health Service were invited to complete a validated nutrition knowledge questionnaire designed by Parmenter and Wardle (1999). The original questionnaire was slightly modified to suit an Irish population. The data obtained was analysed using the Statistical Package for the Social Sciences (SPSS) Software, Version 20.0 and significance was set at the 0.05 level.

Results: A response rate of 85.7% ($n= 96$) was achieved, comprising of 52 females (54.7%) and 43 males (45.3%). This study found that the mean nutritional knowledge score of all participants was 76 ± 12.7 (69.1%). The original hypothesis was therefore accepted. It was noted that female staff had a significantly greater knowledge of nutrition than male staff ($p = 0.048$) and the deputy ward-manager grade (CNM1) had a significantly lower level of knowledge than the ward-manager grade.

Conclusion: The present study has revealed that IFMHN have a good level of nutrition knowledge. However, their relatively poor score in the diet–disease relationships section requires further analysis and may suggest that increased education may be required for mental health nurses in the area of health problems and diseases associated with diet.

2.3 Introduction

Forensic Mental Health Services (FMHS) mainly focus on the treatment and care of mentally disordered individuals who have come into contact with the Criminal Justice System, or patients that may have been transferred from mainstream mental health services and require specialist care (Mental Health Commission, 2011; Cavney, Skipworth, Madell, & McKenna, 2012). Presently, the Irish National Forensic Mental Health Service have 93 secure in-patient beds, including eight designated for females, located at the Central Mental Hospital, Dundrum, Dublin. All patients are legally detained in the hospital under the Mental Health Act (2001) and the Criminal Law Insanity Act (2006). Almost 92% of all admissions to the Irish National Forensic Mental Health Service are within the 20-44 years old age category and 69% were diagnosed with schizophrenia or a delusional disorder (Daly & Walsh, 2010). The general profile of patients treated within many of the FMHS consist of; young single unemployed males, with poor educational achievements and are from a low socioeconomic background (Elder, Evans & Nizette, 2012). As a result, both Cormac (2004) and Phillips et al (2012) proclaim that all mental health professionals have a responsibility to ensure that their patients receive adequate physical and nutritional care and endeavour to advise their patients on diet and healthy eating . Timmons (2010) testified that health promotion and enabling patients to address issues that affect their health was one of the fundamental aspects guiding IFMHN nursing practice.

2.4 Hypotheses

This study assessed the current nutrition knowledge of mental health nurses working within the Irish Forensic Mental Health Service. For the purpose of this research it was primarily hypothesised that IFMHN have a good level of nutrition knowledge. The study aimed to investigate whether this is correct, or whether their level of nutrition knowledge is poor. Secondary hypotheses tested included the following:

- There is no difference in the nutrition knowledge between male and female nurses;
- There is no difference in the nutrition knowledge between nurses of different ages;
- There is no difference in the nutrition knowledge of nurses based on their length of service working within the Irish Forensic Mental Health Service;
- There is no difference in the nutrition knowledge of nurses based on their length of experience working as a nurse;

- There is no difference in the nutrition knowledge of nurses based on their grade/rank;
- There is no difference in the nutrition knowledge of nurses based on their educational level attained.

Chapter 3. Methods

3.1 Participants

Participants were recruited from the Irish Forensic Mental Health Service which is primarily based at the Central Mental Hospital in Dundrum, Co. Dublin. Approximately, 160 registered mental health nurses are employed within this service and are engaged in a range of activities across a broad spectrum of departments and specialties. Inclusion and exclusion criteria were determined prior to the recruitment process as only certain groups within this population have the opportunity to interact with patients on a continuous basis, and therefore be in the position to influence and advise patients on their nutritional choices throughout the day (Refer to Appendix 1).

Following the application of these inclusion and exclusion criteria, 134 registered mental health nurses were eligible for inclusion in this study.

Ethical approval was obtained from the Faculty of Applied Sciences Research Ethics Committee at the University of Chester, UK (Refer to Appendix 2). Permission to undertake the study within the Irish Forensic Mental Health Service was granted by the senior management team. (Refer to Appendix 3). Questionnaires were distributed to only 112 staff as the remaining 22 staff were either on annual leave or long-term sick leave and were unable to be contacted by the researcher. Ninety-six forensic mental

health nurses (86%) returned the questionnaire. Of those, 95 fully completed the questionnaire. One questionnaire was therefore discarded.

The questionnaire (Refer to Appendix 7), cover-letter (Refer to Appendix 5), participant information leaflet (Refer to Appendix 6) and return envelope were enclosed in homogeneous white envelopes and distributed to each individual mental health nurse fulfilling the participant criteria. Issues relating to confidentiality, voluntary participation and ability to withdraw at any time were addressed within the participant information leaflet (Refer to Appendix 6). Participants provided consent by choosing to complete and return the questionnaire in the enclosed envelope directly to the researcher or to the researcher's mailbox at the main reception desk.

3.2 Study Design

3.2.1 The questionnaire

This study utilised a cross-sectional design involving the use of a nutrition knowledge questionnaire (Refer to Appendix 7). Participants were invited to complete a slightly modified version of the General Nutrition Knowledge Questionnaire For Adults (GNQ) (Refer to Appendix 8) developed by Parmenter and Wardle (1999). Permission to use this questionnaire was sought and granted to the researcher by Professor Jane Wardle (Refer to Appendix 4). This widely used questionnaire meets psychometric criteria for reliability and construct validity (Parmenter and Wardle, 1999). The questionnaire

contained 45 items relating to four areas of nutrition knowledge: awareness of dietary recommendations (four items), knowledge of nutrient sources (21 items), choosing everyday foods (ten items), and diet–disease relationships (ten items). Correct responses from each section were added to give a section score, and the four section scores were totalled to give an overall knowledge score out of 110. A small pilot study was performed on six mental health nurses within the IFMHS that were excluded from this study by the application by the inclusion/exclusion criteria. This pilot study confirmed that the questionnaire took approximately fifteen minutes to complete and certain minor adaptations from the original questionnaire were made (Refer to Appendix 9). These amendments included changes to certain food items that were slightly modified to suit an Irish population. Changes were also made to the demographic questions of the original questionnaire to meet the desired objectives and aims of this study (Refer to Appendix 9).

3.2.2 Statistical Analysis

The data was analysed using the Statistical Package for the Social Sciences (SPSS) Software, Version 20.0 and significance was set at the 0.05 level. For investigating the general nutrition knowledge of IFMHN, the mean scores (\pm SD) were calculated and compared. As the GNQ produces only whole numbers, the mean score (\pm SD) was rounded off to a whole number. The mean (\pm SD) was also calculated for each of the four sections assessing various aspects of nutrition knowledge in the questionnaire. As the data from the questionnaire had all the features the real number series and can be

classified as ratio data, parametric tests could be performed to investigate significant differences in and between groups. Normality was assessed and confirmed prior to each test via the Shapiro-Wilk statistic and data are presented as mean \pm standard deviation (SD). An Independent t-test was used to investigate the difference in nutritional knowledge between male and female mental health nurses. In order to assess if there was a difference in the nutrition knowledge between nurses in terms of years qualified, a One-way Independent Groups ANOVA was conducted. A One-way Independent Groups ANOVA was also undertaken to determine if there was a difference in the nutrition knowledge amongst nurses based on their grade/rank and their age. The non-parametric Kruskal-Wallis test was conducted to assess whether there was a difference in nutrition knowledge based on length of service working within the IFMHS as the data failed to meet the assumptions of normal distribution.

Chapter 4. Results

4.1 Sample

A response rate of 85.7% ($n= 96$) was achieved, comprising of 52 females (54.7%) and 43 males (45.3%). This study found that the mean nutritional knowledge score of all participants was 76 ± 12.7 (69.1%)(Refer to Appendix 10) (95 percent confidence interval ± 2.55 , 73.45-78.55). The original hypothesis *IFMHN have a good level of knowledge of nutrition* can therefore be accepted. From the 95 participants included, 31 scored greater than 83 out of 110 (75%), whilst only eight participants were found to have a poor knowledge of nutrition (i.e. scoring below 55 marks out of 110 or less than 50%). The majority of the participants that returned the questionnaire were categorised as having an adequate level of nutrition knowledge (i.e. scoring between 56- 82 marks out of 110 or 50%-75%).

Table ii: *Number of nurses in each nutritional knowledge category*

Nutritional Knowledge	Number of nurses
Poor <50% (<55 out of 110)	8
Average 50%- 75% (56-82 out of 110)	56
Excellent >75% (>83 out of 110)	31

4.2 Nutrition knowledge of males vs. females

Fifty-two females and 43 males completed and returned the questionnaires. An independent t-test was conducted, and a significant difference in the nutrition knowledge between genders was verified ($p = 0.048$). The *null* hypothesis there is no difference in the nutrition knowledge between male and female nurses can therefore be rejected. The overall mean nutrition score for female nurses was 78 ± 12.1 (95 percent confidence interval ± 3.29 , 74.71-81.29) in comparison to males who achieved 73 ± 12 (95 percent confidence interval ± 3.59 , 69.41- 76.59) (Refer to Figure i)

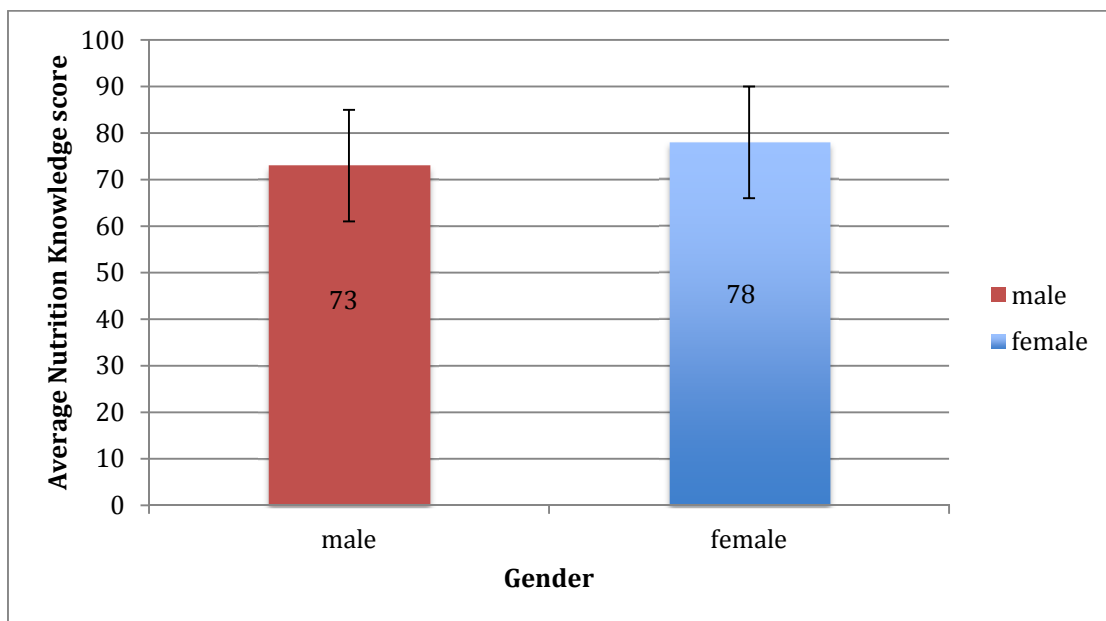


Figure i: Nutrition knowledge of males vs. females

4.3 Nutrition knowledge by years qualified as a nurse.

In terms of years qualified as a nurse, the majority (38 participants), who completed and returned the questionnaires were qualified between one and five years and had a mean score of 78 ± 11.3 . Twenty-seven participants were qualified six to ten years and had a mean score of 75 ± 12.6 , eight participants were qualified 11-15 years and had a mean score of 69 ± 15.7 , 12 participants were qualified 16-20 years and had a mean score of 80 ± 15.5 , and 10 were qualified longer than 20 years and had a mean score of 74 ± 10.7 (Refer to Figure ii). A One way Independent Groups ANOVA showed that there was no significant difference in the nutritional knowledge between the groups ($p = 0.244$). The *null* hypothesis there is no difference in the nutrition knowledge of nurses based on their length of experience working as a nurse can be therefore accepted.

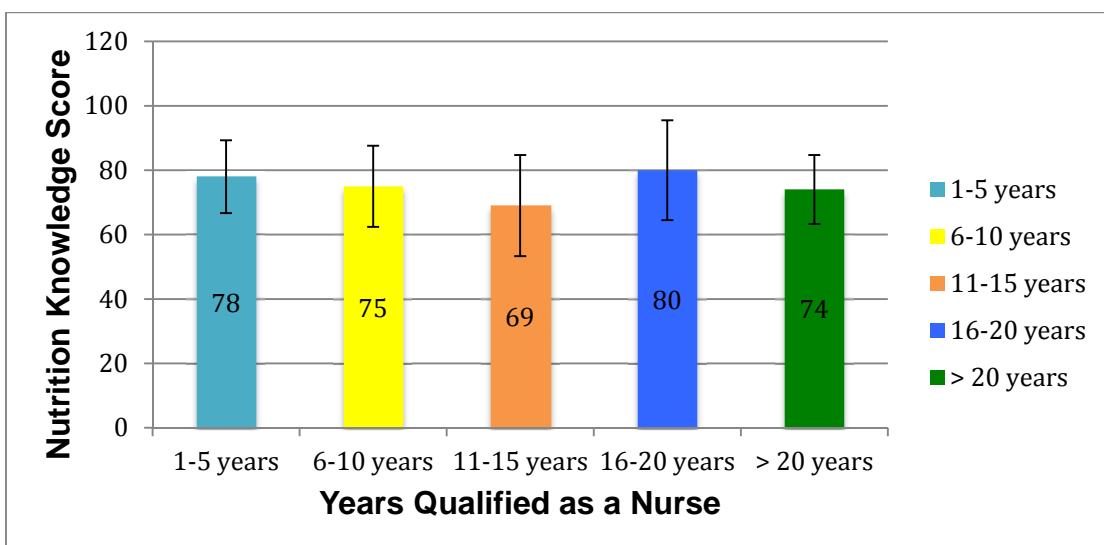


Figure ii: Nutrition knowledge by years qualified as a nurse

4.4 Nutrition knowledge by length of service working within the Irish Forensic Mental Health Services.

The majority (37 participants) of nurses who completed and returned the questionnaires were employed in the service between one and five years and had a mean score of 77 ± 12.3 . Thirty-five participants were employed six to ten years and had a mean score of 73 ± 13.1 . Eight participants were qualified 11-15 years and had a mean score of 80 ± 11.8 , four participants were employed 16-20 years and had a mean score of 84 ± 15.3 , and two were employed longer than 20 years and had a mean score of 76 ± 19.1 (Refer to Figure iii). Nine participants were working within the service for less than one year and had a mean score of 77 ± 11.4 . In order to investigate the difference in nutrition knowledge between these groups the non-parametric Kruskal-Wallis test was undertaken the data failed to meet the assumptions of normal distribution. No significant difference in the nutrition knowledge by the length of service working with the IFMHS was found ($p = 0.809$). The *null* hypothesis that there is no difference in the nutrition knowledge of nurses based on their length of service working within the IFMHS can be therefore accepted.

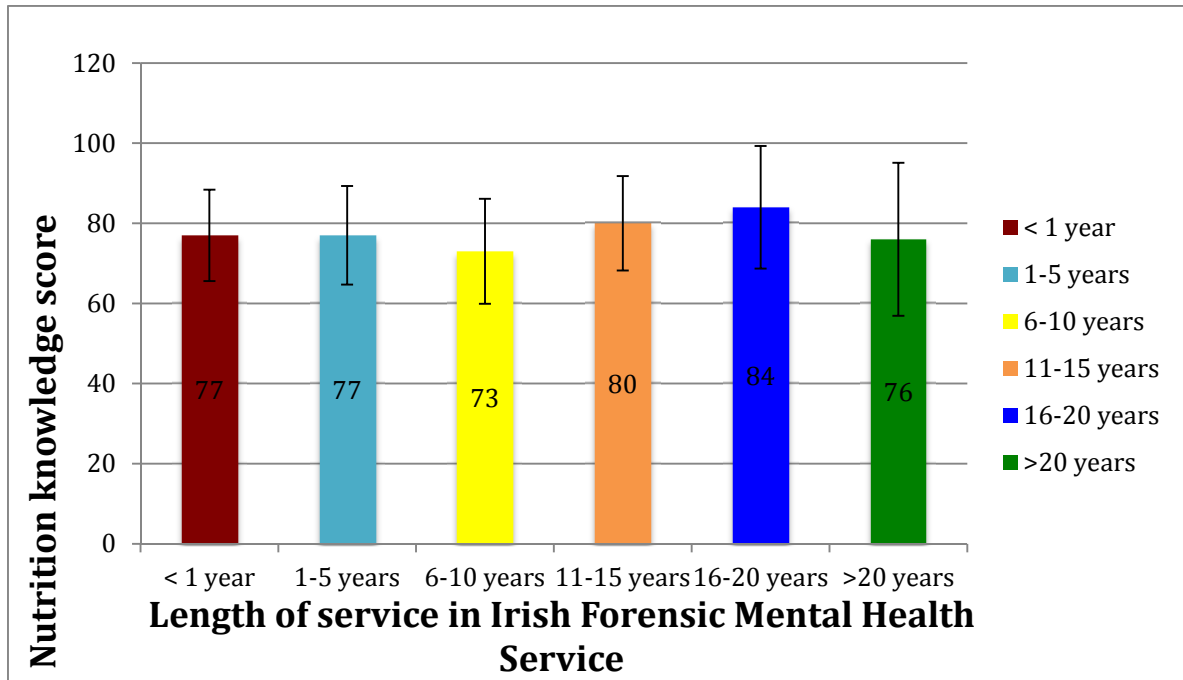


Figure iii: Nutritional knowledge by length of service working within the Irish Forensic Mental Health Services.

4.5 Nutrition knowledge based on age category.

The majority of nurses (38 participants) that completed and returned the questionnaires were in the 30-41 years age category and had a mean knowledge score of 77 ± 11.9 . Thirty-one participants were in the 20-29 years age category and had a mean knowledge score of 76 ± 13.1 , 20 participants were in the 42-53 years age category and had a mean knowledge score of 71 ± 13.3 , and six were in the 54-65 years age category and had a mean knowledge score of 83 ± 11.7 (Refer to Figure iv). The One-way Independent Groups ANOVA also showed that there was no significant difference in the nutritional knowledge between the groups ($p = 0.219$). The *null*

hypothesis there is no difference in the nutrition knowledge between nurses of different age-categories can be therefore accepted.

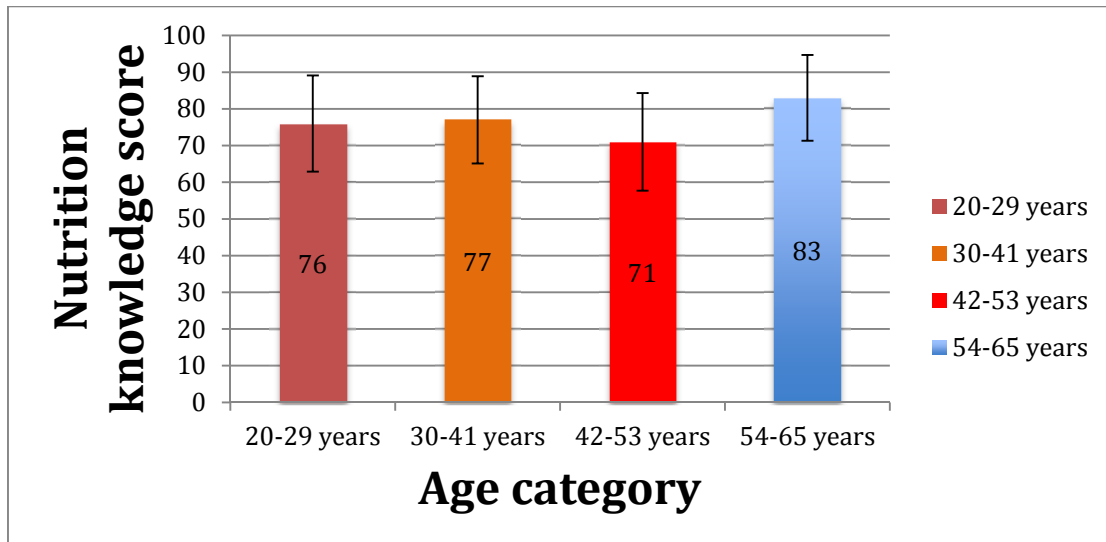


Figure iv: Nutrition knowledge based on age category

4.6 Nutrition knowledge by grade/rank

In terms of the various positions of rank amongst nurses, the majority (80 participants), who completed and returned the questionnaires were staff-nurse grade and had a mean score of 76 ± 11.9 . Seven of the participants were Clinical Nurse Manager 1 (CNM1) grade and had a mean score of 68 ± 17 . Eight participants were Clinical Nurse Manager 2 (CNM2) grade and had a mean score of 83 ± 13.5 (Refer to Figure v). The One Way Independent Groups ANOVA also showed that there was no significant difference in the nutritional knowledge between staff nurses and CNM1 grade and CNM2 grade. However, there was a significant difference between the nutrition knowledge of CNM1 and CNM2 grade. The *null* hypothesis there is no difference in the nutrition knowledge between nurses of different rank/grade can be

therefore rejected.

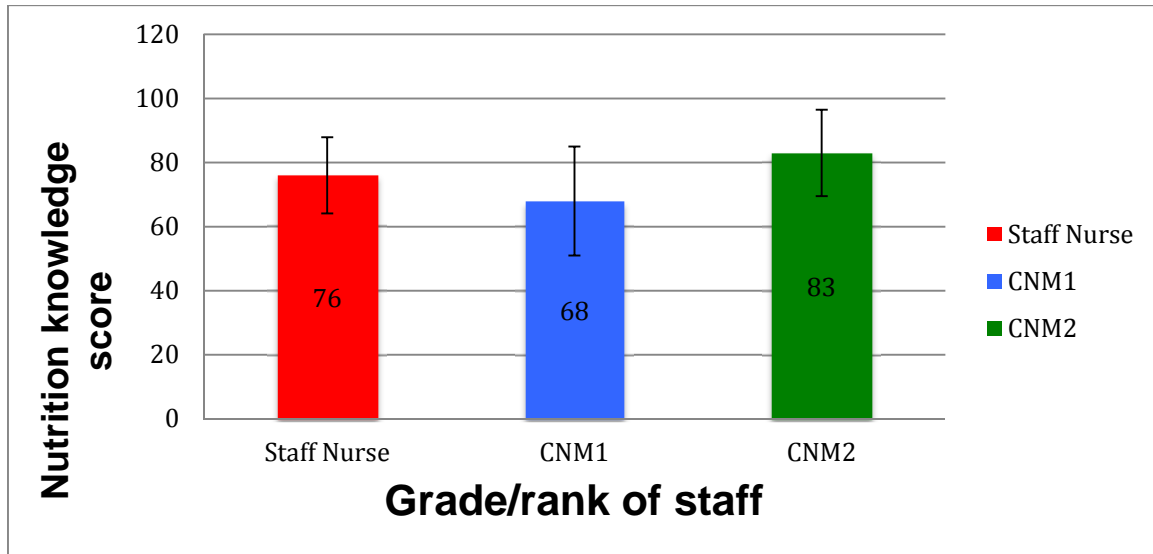


Figure v: Nutrition knowledge by grade/rank

4.7 Nutrition knowledge and education level attained

In relation to the level of education achieved by the nurses and their nutrition knowledge, the majority (50 participants) of nurses who completed and returned the questionnaires had achieved a degree and had a mean score of 77 ± 13 . Twenty-six participants had attained a Masters Degree and had a mean score of 75 ± 10.4 ; nine participants had achieved a Higher Diploma and had a mean score of 78 ± 10.6 . Two of the participants had a certificate and as this number was very small and participants could potentially be identified, they were therefore included in the Diploma group, which increased the number of participants in this category to ten. This group had a mean score of 73 ± 18.4 (Refer to Figure vi). In order to investigate the difference in nutrition knowledge between these groups a One way Independent Groups ANOVA was undertaken and showed that there was no significant difference in the nutritional

knowledge between the groups ($p = 0.747$). The *null* hypothesis there is no difference in the nutrition knowledge between nurses based on their education level can be therefore accepted.

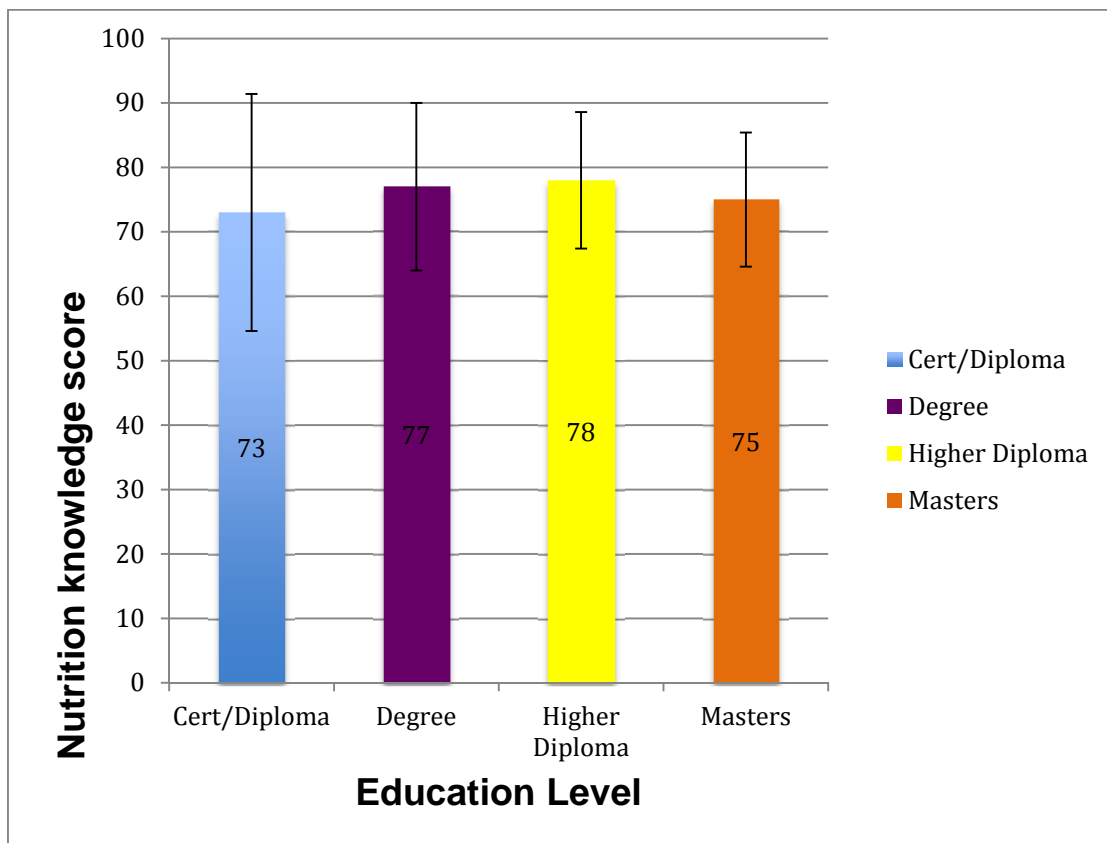


Figure vi: Nutrition knowledge and education level attained

4.8 Breakdown of the results in each section of the questionnaire

The results of each independent section shall now be analysed to enable a more detailed understanding of the aspects of nutrition knowledge that forensic mental health nurses possess.

Section 1- Dietary recommendations

Out of a maximum of 11 points for the first section, the mean score was 9.6 ± 1.5 .

Twenty-nine of the participants (30.5%) answered all the questions correctly and 30 other participants (31.6%) only managed to get one incorrect answer in this section.

The lowest score in this section was two by one male staff nurse. Seventy-six participants (80%) replied that 4-6 servings of fruit and vegetables each day is recommended by experts (Question 2, Section A). However, there was a notable difference in terms of gender, as 65.1% of male participants compared to 92.3% of female participants answered this question correctly.

Question three was answered correctly by 72 of the participants (75.8%). Therefore, over three quarters of the nursing staff is aware that saturated fats should be reduced in the diet.

Section 2- Sources of Foods/Nutrients

Of a possible 69 points for the section on food groups, the mean score was 46.9 ± 8.3 . One female participant achieved full marks in this section (100%), whilst a male nurse had the lowest score with 28 marks (40.6%). Question one contained six parts asking participants to identify whether various food types were high or low in added sugar. Overall, this question scored highly (76.7%), with participants demonstrating a good knowledge of foods with sugar-added. A total of 28 participants (29.5%) answered all six parts correctly. There was a good knowledge demonstrated by the participants in identifying foods that were high in fat (Question 2) with an overall average score of 66% across all the food types. Participants were excellent at identifying baked beans (85.3%), honey (79%), and chicken goujons (86.3%) as either high or low fat foods. However, the majority of participants (72.6%) did not know that low fat spread was actually high in fat. Less than half of all participants (49.5%) were aware that sliced ham and Flora margarine were similarly high in fat. Participants also scored highly (75%) when asked to identify whether certain foods were high or low in salt (Question 4). Food items such as sausages (95.8%), pasta (77.9%) and frozen vegetables (85.3%) were correctly identified as either having a high or low salt content. In terms of understanding the protein content across a range of food products (Question 5), the participants scored on average 81.6%. Ninety participants (94.7%) recognised that chicken was high in protein, although only 66.3% ($n= 63$) were aware that cheese was high in protein.

Section 3- Choosing Everyday Foods

Out of a maximum of 10 points on this section, the mean score was 7.2 ± 1.9 . Four of the participants managed to achieve the maximum score in this section (100%), whilst the lowest score was one correct answer (10%). Question 7 required participants to choose a snack that was low in added sugar from four various options. Seventy participants (73.7%) correctly choose banana with plain yoghurt as the correct option, with 76.9% of females ($n = 40$) compared to 72.1% of males ($n = 31$) answering correctly. Question 10 requested participants to select a low salt option from a selection of dinner meals. Sixty-seven participants (70.5%) correctly selected the mushroom omelette. Further analysis showed that 76.9% of females answered this question correctly ($n = 40$), compared to 60.5% of males correct ($n = 26$).

Section 4- Diet-Disease Relationships

The final section examined the relationship between diet and disease and the mean score was 12.2 ± 4.0 out of a possible 20 points. One male staff achieved the maximum score (100%) in this section whilst, the lowest mark was 5% by another male participant. Seventy-six participants (80%) were able to suggest at least one major health problem associated with low intake of fruit and vegetables. Seventy-nine participants (83.2%) were able to identify at least one major health complication associated with a low intake of fibre and 92.6% of participants ($n = 88$) correctly identified one major illness/disease linked to a high dietary intake of sugar. Only 62.1% of participants ($n = 59$) answered that saturated fats was most likely to raise blood cholesterol level.

Chapter 5. Discussion

The results of this survey give a clear and detailed picture of a broad range of nutrition knowledge in a large sample of IFMHN. The response rate (almost 86%) was an excellent return and participants demonstrated a good level of nutrition knowledge with an average score of 69.1% (SD = 12.7). In comparison, nurses working in a forensic mental health unit in New Zealand scored only 50% in a study examining their nutrition knowledge (Forsyth et al., 2012). In relation to other nursing specialties, IFMHN compare well to their nursing colleagues that work in a range of specialties including surgery (57%) (Kobe, 2006); acute care (60.2%) (Schaller and James, 2005); internal medicine, nephrology, surgery, and neurology (58.4%) (Park et al., 2011); long-term care (65%) (Crogan, Shultz, & Massey, 2001); Interestingly, twenty-two years ago, Stanek, Powell and Betts (1991) reported a mean nutrition knowledge score of 60% in nurses also working in long-term care facilities. However, nurses involved in Abdollahi et al. (2013) study in a number of teaching hospitals in Iran scored on average 73% on nutrition knowledge, whilst primary care nurses in Scotland scored significantly higher than the present study with an average score of 84% (Hankey et al., 2004).

No significant difference was observed in nutrition knowledge in terms of age, amount of years qualified and length of experience working in the IFMHS. This contrasts with findings by Lindseth (1997) and Schaller and James (2005) in which older nurses had statistically significant higher nutrition knowledge scores than younger nurses; and similarly, nurses with more than 10 years experience had a

statistically significant higher knowledge score than nurses with 10 years or less experience (Schaller and James, 2005). In terms of nutrition knowledge based on education level, nurses with higher education levels achieved higher a score, although no significant difference was observed, which were comparable to findings from studies by Yalcin, Cihan, Gundogdu and Ocakci (2013) and Ozcelyz, Surruuoglu and Akan (2007).

However, a significant difference in the nutrition knowledge between male and female staff was verified ($p = 0.048$). Various other studies that have investigated the nutrition knowledge difference between males and females have also noted that females scored higher than males across a wide range of populations including European adolescents (Kersting et al., 2008), a sample UK population (Parmenter, Waller & Wardle, 2000), a sample Australian population (Hendrie, Cox, & Coveney, 2008) and young elite Australian athletes (Spendlove et al., 2012).

Chapter 6. Limitations of study and recommendations for future research

Although this questionnaire has been used extensively in numerous other studies, it is now 14 years ago since it was originally developed by Parmenter and Wardle (1999), and some of the questions and answers could be considered dated and irrelevant. However, this questionnaire has been more recently utilised and validated in studies involving a Turkish student population (Alsaffar, 2012), an Australian community sample (Hendrie et al., 2008) and elite Australian athletes (Spendlove et al., 2012) . One of the other major limitations of this study is that while it assessed the nutrition knowledge of forensic mental health nurses, it failed to ascertain if the nutrition knowledge they possessed had any impact on their daily interaction with patients regarding their diet and food choices. It also failed to determine the role that nurses undertake in advising and educating patients on their diet. Finally, several respondents remarked on the length of the questionnaire (14 pages), which may have had an affect on the level of attention and effort participants spent answering each question.

The present study has provided an introduction into the area of nutrition knowledge amongst IFMHN. Previous to this study, the literature concerning this important topic has been very limited with only Forsyth, Elmslie and Ross (2012) undertaking a small qualitative study in New Zealand. Given the alarming levels of obesity identified within forensic mental health in the literature review, this area requires immediate attention. Future studies could investigate the methods and means by which forensic mental health nurses educate and guide their patients in

making healthy dietary choices. It would also be very interesting to assess the nutrition knowledge of forensic mental health patients to assess the level of understanding they have in choosing healthy food options and their awareness of current dietary recommendations.

Chapter 7. Conclusion

This study has investigated the nutrition knowledge of IFMHN. The study found that the mean nutritional knowledge score of participants was 76 ± 12.7 , which reflects a good level of nutrition knowledge. Similar to the findings of various other studies, it was noted that female staff had a significantly greater knowledge of nutrition than male staff ($p = 0.048$). No significant difference was noted in nutrition knowledge between nurses in terms of years qualified, length of service within the IFMHS and age category. Perhaps, the most interesting findings from this study relate to the lower than expected knowledge level of the CNM1 grade (67.6 ± 17). This first line-manager grade has an important role in the day-to day management and functioning within the IFMHS. The fact that they have a significantly lower level of knowledge may impact significantly upon staff-nurses under their direction and patients in their care.

Each of the four sections covered by the questionnaire scored well, although it was surprising that section four, which examined the relationship between diet and disease scored lowest (61%). This area requires further study and analysis to determine whether forensic mental health nurses require additional training in disease and health problems specifically associated with diet. Given the increased prevalence of physical morbidity in those suffering with mental illness identified in the literature review, developing and enhancing nurses' knowledge of the relationship between diet and disease may resolve some of the underlying factors in this challenging problem.

Reference List

Abdollahi, M., Houshiarrad, A., Abtahi, M., Esmaeli, M., Pouraram, H., Khoshfetrat, M. R., ... Heidari Keshel, S. (2013). The nutrition knowledge level of physicians, nurses and nutritionists in some educational hospitals. *Journal of Paramedical Sciences, 4*, 106-114. Retrieved from <http://journals.sbmu.ac.ir/jps/article/view/4151>

Allen, J. K., Blumenthal, R. S., Margolis, S., Young, D. R., Miller, E. R., & Kelly, K. (2002). Nurse case management of hypercholesterolemia in patients with coronary heart disease: Results of a randomized clinical trial. *American Heart Journal, 144*(4), 678–686.

Allison, D. B., Mentore, J. L., Heo, M., Chandler, L. P., Cappelleri, J. C., Infante, M. C., & Weiden, P. J. (1999). Antipsychotic-induced weight gain: A comprehensive research synthesis. *The American Journal of Psychiatry, 156*(11), 1686–1696.

Alsaffar, A. A. (2012). Validation of a general nutrition knowledge questionnaire in a Turkish student sample. *Public Health Nutrition, 15*(11), 2074–2085.
doi:10.1017/S1368980011003594

American Academy of Family Physicians (2000) Core educational guidelines: Patient education. *American Family Physician*. 62(7), 1712-1714. Retrieved from <http://www.aafp.org/afp/2000/1001/p1712.html>

Bjerrum, M., Tewes, M., & Pedersen, P. (2012). Nurses' self-reported knowledge about and attitude to nutrition -- before and after a training programme. *Scandinavian Journal of Caring Sciences*, 26(1), 81–89. doi:10.1111/j.1471-6712.2011.00906.x

Bouza, C., López-Cuadrado, T., & Amate, J. M. (2010). Hospital admissions due to physical disease in people with schizophrenia: a national population-based study. *General Hospital Psychiatry*, 32(2), 156–163. doi:10.1016/j.genhosppsy.2009.11.014

Bray, G. A. (2006). Obesity: the disease. *Journal of Medicinal Chemistry*, 49(14), 4001–4007. doi:10.1021/jm0680124

Brown, A. D. H., Barton, D. A., & Lambert, G. W. (2009). Cardiovascular abnormalities in patients with major depressive disorder: autonomic mechanisms and implications for treatment. *CNS Drugs*, 23(7), 583–602.

Brown, S., Birtwistle, J., Roe, L., & Thompson, C. (1999). The unhealthy lifestyle of people with schizophrenia. *Psychological Medicine*, 29(3), 697–701.

Casey, D. E., Haupt, D. W., Newcomer, J. W., Henderson, D. C., Sernyak, M. J., Davidson, M., ... Hennekens, C.H., (2004). Antipsychotic-induced weight gain and metabolic abnormalities: Implications for increased mortality in patients with schizophrenia. *The Journal of Clinical Psychiatry*, 65 (7), 4–18.

Centers for Disease Control and Prevention. *Fruits and Vegetables Recommendations*.

Retrieved December 20,2012 from

<http://www.cdc.gov/nutrition/everyone/fruitsvegetables/results/women.html?age=30&gender=female&activity=active>

Choong, E., Bondolfi, G., Etter, M., Jermann, F., Aubry, J.-M., Bartolomei, J., ... Eap, C.P. (2012). Psychotropic drug-induced weight gain and other metabolic complications in a Swiss psychiatric population. *Journal of Psychiatric Research*, 46(4), 540–548. doi:10.1016/j.jpsychires.2012.01.014

Citrome, L., & Vreeland, B. (2008). Schizophrenia, obesity, and antipsychotic medications: What can we do? *Postgraduate Medicine*, 120(2), 18–33.

doi:10.3810/pgm.2008.07.1786

Coodin, S. (2001). Body mass index in persons with schizophrenia. *Canadian Journal of Psychiatry. Revue Canadienne de Psychiatrie*, 46(6), 549–555.

Cope, M. B., Nagy, T. R., Fernández, J. R., Geary, N., Casey, D. E., & Allison, D. B. (2005). Antipsychotic drug-induced weight gain: development of an animal model. *International Journal of Obesity*, 29(6), 607–614. doi:10.1038/sj.ijo.0802928

Cormac, I., Ferriter, M., Benning, R., & Saul, C. (2005). Physical health and health risk factors in a population of long-stay psychiatric patients. *Psychiatric Bulletin*, 29(1), 18–20. doi:10.1192/pb.29.1.18

Cormac, I., Martin, D., & Ferriter, M. (2004). Improving the physical health of long-stay psychiatric in-patients. *Advances in Psychiatric Treatment*, 10(2), 107–115. doi:10.1192/apt.10.2.107

Craig, R., Mindell, J., & Hirani, V. (2008). *Physical activity and fitness. A survey carried out on behalf of the NHS information centre.* (HSE/2008). London, United Kingdom: The Health And Social Information Centre. Retrieved from <http://www.ic.nhs.uk/pubs/hse08physicalactivity>

Crogan, N. L., Shultz, J. A., & Massey, L. K. (2001). Nutrition knowledge of nurses in long-term care facilities. *Journal of Continuing Education in Nursing, 32*(4), 171–176.

Davison, K.M., Cairns, J., Selly, C., Ng, E., Chandrasekera, U., Sengmueller, E., ... Palmer, J. (2012). *The role of nutrition care for mental health conditions*. Toronto, Canada: Dietitians of Canada. Retrieved from www.dietitians.ca/mentalhealth

De Hert, M., Correll, C. U., Bobes, J., Cetkovich-Bakmas, M., Cohen, D., Asai, I., ... Leucht, S. (2011). Physical illness in patients with severe mental disorders. I. Prevalence, impact of medications and disparities in health care. *World Psychiatry, 10*(1), 52–77.

Dickerson, F. B., Brown, C. H., Kreyenbuhl, J. A., Fang, L., Goldberg, R. W., Wohlheiter, K., & Dixon, L. B. (2006). Obesity among individuals with serious mental illness. *Acta Psychiatrica Scandinavica, 113*(4), 306–13. doi:10.1111/j.1600-0447.2005.00637.x

Eldridge, D., Dawber, N., & Gray, R. (2011). A well-being support program for patients with severe mental illness: A service evaluation. *BMC Psychiatry, 11*(1), 46.
doi:10.1186/1471-244X-11-46

Fagiolini, A., Kupfer, D. J., Houck, P. R., Novick, D. M., & Frank, E. (2003). Obesity as a

correlate of outcome in patients with bipolar I disorder. *The American Journal of Psychiatry*, 160(1), 112–117.

Foley, D. L., & Morley, K. I. (2011). Systematic review of early cardiometabolic outcomes of the first treated episode of psychosis. *Archives of General Psychiatry*, 68(6), 609–616. doi:10.1001/archgenpsychiatry.2011.2

Forsyth, N., Elmslie, J., & Ross, M. (2012). Supporting healthy eating practices in a forensic psychiatry rehabilitation setting. *Nutrition & Dietetics*, 69(1), 39–45. doi:10.1111/j.1747-0080.2011.01568.x

Gibson, M., Carek, P. J., & Sullivan, B. (2011). Treatment of co-morbid mental illness in primary care: How to minimize weight gain, diabetes, and metabolic syndrome. *International Journal of Psychiatry in Medicine*, 41(2), 127–42.

Giskes, K., Van Lenthe, F., Avendano-Pabon, M., & Brug, J. (2011). A systematic review of environmental factors and obesogenic dietary intakes among adults: Are we getting closer to understanding obesogenic environments? *Obesity Reviews*, 12(5), e95–e106. doi:10.1111/j.1467-789X.2010.00769.x

Goff, D. C., Sullivan, L. M., McEvoy, J. P., Meyer, J. M., Nasrallah, H. A., Daumit, G. L., ...

- Lieberman, J.A. (2005). A comparison of ten-year cardiac risk estimates in schizophrenia patients from the CATIE study and matched controls. *Schizophrenia Research, 80*(1), 45–53. doi:10.1016/j.schres.2005.08.010
- Hankey, C., Eley, S., Leslie, W., Hunter, C., & Lean, M. (2004). Eating habits, beliefs, attitudes and knowledge among health professionals regarding the links between obesity, nutrition and health. *Public Health Nutrition, 7*(2), 337–343. Retrieved from http://journals.cambridge.org/download.php?file=%2FPHN%2FPHN7_02%2FS1368980004000369a.pdf&code=f65b50a3f93d271cad870197ef071dd8
- Haw, C., & Rowell, A. (2011). Obesity and its complications: A survey of inpatients at a secure psychiatric hospital. *The British Journal of Forensic Practice, 13*(4), 270–277. doi:10.1108/14636641111190033
- Hendrie, G. A., Cox, D. N., & Coveney, J. (2008). Validation of the General Nutrition Knowledge Questionnaire in an Australian community sample. *Nutrition & Dietetics, 65*(1), 72–77. doi:10.1111/j.1747-0080.2007.00218.x
- Hennekens, C. H., Hennekens, A. R., Hollar, D., & Casey, D. E. (2005). Schizophrenia and increased risks of cardiovascular disease. *American Heart Journal, 150*(6), 1115–1121. doi:10.1016/j.ahj.2005.02.007

- Holt, R. I. G., & Peveler, R. C. (2009). Obesity, serious mental illness and antipsychotic drugs. *Diabetes, Obesity & Metabolism*, 11(7), 665–679. doi:10.1111/j.1463-1326.2009.01038.x
- Katzman, M. A., Jacobs, L., Marcus, M., Vermani, M., & Logan, A. C. (2007). Weight gain and psychiatric treatment: Is there a role for green tea and conjugated linoleic acid? *Lipids in Health and Disease*, 6, 14. doi:10.1186/1476-511X-6-14
- Kersting, M., Sichert-Hellert, W., Vereecken, C. A., Diehl, J., Béghin, L., De Henauw, S., ... Sette, S. (2008). Food and nutrient intake, nutritional knowledge and diet-related attitudes in European adolescents. *International Journal of Obesity*, 32(5), 35–41. doi:10.1038/ijo.2008.181
- Kim, S.F., Huang, A.S., Snowman, A.M., Teuscher, C., Snyder, S.H. (2007). Antipsychotic drug-induced weight gain mediated by histamine H1 receptor-linked activation of hypothalamic AMP-kinase, *Proceedings of the National Academy of Sciences*, 104(9), 3456-3259.
- Kobe, J.A. (2006) *Aspects of nutritional knowledge, attitudes, and practices of nurses working in the surgical division at the Kenyatta National Hospital, Kenya.* (Unpublished master's thesis). Stellenbosch University, Stellenbosch, South Africa. Retrieved from <http://hdl.handle.net/10019.1/1514>

Laursen, T. M., Munk-Olsen, T., Agerbo, E., Gasse, C., & Mortensen, P. B. (2009). Somatic hospital contacts, invasive cardiac procedures, and mortality from heart disease in patients with severe mental disorder. *Archives of General Psychiatry, 66*(7), 713–720. doi:10.1001/archgenpsychiatry.2009.61

Lawrence, D. M., Holman, C. D. J., Jablensky, A. V., & Hobbs, M. S. T. (2003). Death rate from ischaemic heart disease in Western Australian psychiatric patients 1980-1998. *The British Journal of Psychiatry, 182*, 31–36.

Lawrence, D., & Kisely, S. (2010). Inequalities in healthcare provision for people with severe mental illness. *Journal of Psychopharmacology, 24*(4), 61–68.
doi:10.1177/1359786810382058

Lindseth, G. (1997). Factors affecting graduating nurses' nutritional knowledge: implications for continuing education. *Journal of Continuing Education in Nursing, 28*(6), 245–251.

Littrell, K. H., Hilligoss, N. M., Kirshner, C. D., Petty, R. G., & Johnson, C. G. (2003). The effects of an educational intervention on antipsychotic-induced weight gain. *Journal of Nursing Scholarship, 35*(3), 237–241. doi:10.1111/j.1547-

5069.2003.00237.x

Long, C., Brillon, A., Schell, D., & Webster, P. (2009). The nutrition and eating habits of women in secure psychiatric conditions: A survey with implications for practice and action. *The British Journal of Forensic Practice*, *11*(3), 28–34.

doi:10.1108/14636646200900020

Maina, G., Salvi, V., Vitalucci, A., D'Ambrosio, V., & Bogetto, F. (2008). Prevalence and correlates of overweight in drug-naïve patients with bipolar disorder. *Journal of Affective Disorders*, *110*(1-2), 149–155. doi:10.1016/j.jad.2007.12.233

McCreadie, R., Macdonald, E., Blacklock, C., Tilak-Singh, D., Wiles, D., Halliday, J., & Paterson, J. (1998). Dietary intake of schizophrenic patients in Nithsdale, Scotland: Case-control study. *British Medical Journal*, *317*(7161), 784–785.

McElroy, S. L. (2009). Obesity in patients with severe mental illness: Overview and management. *The Journal of Clinical Psychiatry*, *70*, 3, 12–21.

doi:10.4088/JCP.7075su1c.03

McElroy, S. L., Frye, M. A., Suppes, T., Dhavale, D., Keck, P. E., Leverich, G. S., ... Post, R.M. (2002). Correlates of overweight and obesity in 644 patients with bipolar disorder. *The Journal of Clinical Psychiatry*, *63*(3), 207–213.

McElroy, S.L., Guerdjikova, A., & Kotwal, R. (2006). Severe mental illness and obesity. In R.A. Bermudes, P.E. Keck & S.L. McElroy (Eds.), *Managing metabolic abnormalities in the psychiatrically ill: a clinical guide for psychiatrists* (pp. 55-119). Virginia, United States: American Psychiatric Publishing.

National Institute of Health. (1998). *Clinical guidelines on the identification, evaluation and treatment of overweight and obesity in adults: the evidence report* (NIH Publication No. 98-4083). Bethesda, Maryland, United States: NIH.

New, J. P., Mason, J. M., Freemantle, N., Teasdale, S., Wong, L. M., Bruce, N. J., ... Gibson, J.M. (2003). Specialist nurse-led intervention to treat and control hypertension and hyperlipidemia in diabetes (SPLINT): a randomized controlled trial. *Diabetes care*, *26*(8), 2250–2255.

Newcomer, J. W. (2005). Second-generation (atypical) antipsychotics and metabolic effects: A comprehensive literature review. *CNS Drugs*, *19*(1), 1–93.

Ohlsen, R. I., Treasure, J., & Pilowsky, L.S. (2004). A dedicated nurse-led service for antipsychotic-induced weight gain: An evaluation. *Psychiatric Bulletin*, *28*(5), 164–166. doi:10.1192/pb.28.5.164

- Osborn, D. P. J., Levy, G., Nazareth, I., Petersen, I., Islam, A., & King, M. B. (2007). Relative risk of cardiovascular and cancer mortality in people with severe mental illness from the United Kingdom's General Practice Research Database. *Archives of General Psychiatry*, *64*(2), 242–249. doi:10.1001/archpsyc.64.2.242
- Ozcelyk, A.O., Surucuoglu, M.S., & Akan, L.A. (2007). Nutrition knowledge level of nurses in turkey: Ankara as an example. *Pakistan Journal of Social Sciences*, *4*(3), 485-489.
- Pack, S. (2009). Poor physical health and mortality in patients with schizophrenia. *Nursing Standard*, *23*(21), 41–45.
- Park, K. A., Cho, W. I., Song, K. J., Lee, Y. S., Sung, I. S., & Choi-Kwon, S. M. (2011). Assessment of nurses' nutritional knowledge regarding therapeutic diet regimens. *Nurse Education Today*, *31*(2), 192–197.
doi:10.1016/j.nedt.2010.05.017
- Parmenter, K., & Wardle, J. (1999). Development of a general nutrition knowledge questionnaire for adults. *European journal of clinical nutrition*, *53*(4), 298–308.

- Parmenter, K., Waller, J., & Wardle, J. (2000). Demographic variation in nutrition knowledge in England. *Health Education Research, 15*(2), 163–174.
doi:10.1093/her/15.2.163
- Petry, N. M., Barry, D., Pietrzak, R. H., & Wagner, J. A. (2008). Overweight and obesity are associated with psychiatric disorders: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Psychosomatic Medicine, 70*(3), 288–297. doi:10.1097/PSY.0b013e3181651651
- Phelan, M. (2001). Physical health of people with severe mental illness. *British Medical Journal, 322*(7284), 443–444. doi:10.1136/bmj.322.7284.443
- Rask, M., & Levander, S. (2001). Interventions in the nurse-patient relationship in forensic psychiatric nursing care: A Swedish survey. *Journal of Psychiatric and Mental Health Nursing, 8*(4), 323–333.
- Reynolds, G. P., Hill, M. J., & Kirk, S. L. (2006). The 5-HT_{2C} receptor and antipsychotic-induced weight gain - mechanisms and genetics. *Journal of Psychopharmacology, 20*(4), 15–18. doi:10.1177/1359786806066040
- Roshanaei-Moghaddam, B., & Katon, W. (2009). Premature mortality from general

medical illnesses among persons with bipolar disorder: A review. *Psychiatric Services*, 60(2), 147–156. doi:10.1176/appi.ps.60.2.147

Ross, H., Laws, R., Reckless, J., & Lean, M. (2008). Evaluation of the Counterweight Programme for obesity management in primary care: A starting point for continuous improvement. *British Journal of General Practice*, 58(553), 548-554. doi: 10.3399/bjgp08X319710

Ryan, M. C. M., Flanagan, S., Kinsella, U., Keeling, F., & Thakore, J. H. (2004). The effects of atypical antipsychotics on visceral fat distribution in first episode, drug-naive patients with schizophrenia. *Life Sciences*, 74(16), 1999–2008. doi:10.1016/j.lfs.2003.08.044

Saarni, S. E., Saarni, S. I., Fogelholm, M., Heliövaara, M., Perälä, J., Suvisaari, J., & Lönnqvist, J. (2009). Body composition in psychotic disorders: a general population survey. *Psychological Medicine*, 39(5), 801–810. doi:10.1017/S0033291708004194

Schaller, C., & James, E. L. (2005). The nutritional knowledge of Australian nurses. *Nurse Education Today*, 25(5), 405–412. doi:10.1016/j.nedt.2005.04.002

- Schwartz, T. L., Nihalani, N., Jindal, S., Virk, S., & Jones, N. (2004). Psychiatric medication-induced obesity: A review. *Obesity Reviews*, 5(2), 115–121. doi:10.1111/j.1467-789X.2004.00139.x
- Scott, D., & Happell, B. (2011). The high prevalence of poor physical health and unhealthy lifestyle behaviours in individuals with severe mental illness. *Issues in Mental Health Nursing*, 32(9), 589–597. doi:10.3109/01612840.2011.569846
- Shrivastava, A., & Johnston, M. E. (2010). Weight-gain in psychiatric treatment: Risks, implications, and strategies for prevention and management. *Mens Sana Monographs*, 8(1), 53–68. doi:10.4103/0973-1229.58819
- Sicras, A., Rejas, J., Navarro, R., Serrat, J. & Blanca, M. (2008). Metabolic syndrome in bipolar disorder: A cross-sectional assessment of a Health Management Organization database. *Bipolar Disorders*, 10(5), 607–616. doi:10.1111/j.1399-5618.2008.00599.x
- Simon, G. E., Ludman, E. J., Linde, J. A., Operskalski, B. H., Ichikawa, L., Rohde, P., ... Jeffery, R.W. (2008). Association between obesity and depression in middle-aged women. *General Hospital Psychiatry*, 30(1), 32–39. doi:10.1016/j.genhosppsy.2007.09.001

Smith, M., & McCarthy, M. P. (2010). Disciplinary knowledge in nursing education: Going beyond the blueprints. *Nursing Outlook*, 58(1), 44–51.

doi:10.1016/j.outlook.2009.09.002

Smith, S., Yeomans, D., Bushe, C.J., Eriksson, C., Harrison, T., Holmes, R., ... Sullivan, G., (2007) A well-being programme in severe mental illness. Reducing risk for physical ill-health: A post-programme service evaluation at 2 years. *European Psychiatry*, 22(7), 413-418.

Spendlove, J. K., Heaney, S. E., Gifford, J. A., Prvan, T., Denyer, G. S., & O'Connor, H. T. (2012). Evaluation of general nutrition knowledge in elite Australian athletes. *The British Journal of Nutrition*, 107(12), 1871–1880.

doi:10.1017/S0007114511005125

Stanek, K., Powell, C., & Betts, N. (1991). Nutritional knowledge of nurses in long-term health care facilities. *Journal of Nutrition For the Elderly*, 10(3), 35–48.

Strassnig, M., Brar, J. S., & Ganguli, R. (2003). Body mass index and quality of life in community-dwelling patients with schizophrenia. *Schizophrenia Research*, 62(1-2), 73–76.

Timmons, D. (2010) Forensic psychiatric nursing: a description of the role of the psychiatric nurse in a high secure psychiatric facility in Ireland. *Journal of Psychiatric and Mental Health Nursing*. 17(7), 636-646. doi: 10.1111/j.1365-2850.2010.01581.x.

The Mental and Physical Health Platform. (2008). *Bridging the gap between mental and physical health*. Retrieved from http://ec.europa.eu/health/mental_health/eu_compass/policy_recommendations_declarations/mh_charter_en.pdf

The Schizophrenia Commission (2012) *The abandoned illness: a report from the Schizophrenia Commission*. London, United Kingdom: Rethink Mental Illness.

The State Hospital Board for Scotland. (2011). The nutrition and weight management clinical governance report. Retrieved from http://www.tsh.scot.nhs.uk/Care_And_Treatment/docs/FFN%20Annual%20Report%20Nov11.pdf

Wańkiewicz, A., Piotrowski, W., Sygnowska, E., Broda, G., Drygas, W., Zdrojewski, ... Biela, U. (2008). Quality of nutrition and health knowledge in subjects with diagnosed cardio-vascular diseases in the Polish population--National Multicentre Health Survey (WOBASZ). *Kardiologia Polska*, 66(5), 507–513.

Wilson, R. (2008) Care of the mentally ill in forensic settings. In M.A. Boyd (Ed.)
Psychiatric nursing: Contemporary practice (pp.771-778) Philadelphia: Wolters
Kluwer/LippincottWilliams andWilkins.

Wirshing, D. A. (2004). Schizophrenia and obesity: Impact of antipsychotic medications.
The Journal of Clinical Psychiatry, 65(1), 13–26.

World Health Organization. (2004). *Global strategy on diet, physical activity and health*.
(Resolution A/RES/66/2). Geneva, Switzerland: WHO. Retrieved from
[http://www.who.int/dietphysicalactivity/strategy/eb11344/strategy_english_w
eb.pdf](http://www.who.int/dietphysicalactivity/strategy/eb11344/strategy_english_w
eb.pdf)

Yalcin, N., Cihan, A., Gundogdu, H., & Ocakci, A. (2013). Nutrition knowledge level of
nurses. *Health Science Journal, 7*(1), 99-108. Retrieved from
<http://www.hsj.gr/volume7/issue1/7110.pdf>

Appendices

Appendix 1: Inclusion/Exclusion criteria

Inclusion criteria

- Registered Mental Health Nurses employed in the Irish Forensic Mental Health Services.
- Ward-based nurses or nurses working within the Primary Healthcare Clinic or Recreation Department.

Exclusion criteria

- Registered Mental Health Nurses who are not based on the wards, Primary Healthcare Clinic or Recreation Department.
- Other grades and disciplines working within the Irish Forensic Mental Health Service.

Appendix 2: Copy of ethical approval from University of Chester Faculty of Applied Sciences Research Ethics Committee (FREC)



**Faculty of Applied Sciences
Research Ethics Committee**

frec@chester.ac.uk

10th April 2013

Dear Peter,

Study title: Irish Forensic Mental Health Nurses Knowledge of Nutrition.
FREC reference: 752/13/PM/CS
Version number: 1

Thank you for sending your application to the Faculty of Applied Sciences Research Ethics Committee for review.

I am pleased to confirm ethical approval for the above research, provided that you comply with the conditions set out in the attached document, and adhere to the processes described in your application form and supporting documentation.

The final list of documents reviewed and approved by the Committee is as follows:

Document	Version	Date
Application Form	1	January 2013
Appendix 1 – List of References	1	January 2013
Appendix 2 – C.V. for Lead Researcher	1	January 2013
Appendix 3 – Letter of Invitation to Participants	1	January 2013
Appendix 4 – Participant Information Sheet	1	January 2013
Appendix 5 – Letters to the Director of Nursing and Clinical Director of the Irish Forensic Mental Health Service	1	January 2013
Appendix 6 – Questionnaire	1	January 2013
Appendix 7 – Advertisement Material and amendments made to original questionnaire	1	January 2013

Appendix 7 – Advertisement Material and amendments made to original questionnaire	1	January 2013
Response to FREC request for further information and clarification		April 2013
Appendix 4 – Participant Information Sheet	2	February 2013
Appendix 7 – Advertisement Material	2	February 2013
Appendix 4 – Participant Information Sheet	3	April 2013

With the Committee's best wishes for the success of this project.

Yours sincerely,

Prof. Cynthia Burek
Acting Chair, Faculty Research Ethics Committee

Enclosures: Standard conditions of approval.

Cc. Supervisor/FREC Representative

Appendix 3: Copy of email granting ethical approval to undertake study within the Irish Forensic Mental Health Service.

Begin forwarded message:

From: DAVID TIMMONS
Subject: MSc in Nutrition
Date: 22 January 2013 19:46:18 GMT
To: Peter McCrarren
Cc: PAUL BRAHAM, Harry Kennedy

Dear Peter

I am pleased to inform you that you can proceed with your research project on nurses knowledge on nutrition.

We look forward to seeing the results of your work.

Regards

David Timmons
NPDC

Appendix 4: Copy of email granting permission to use questionnaire from Professor Wardle

Hi Laura,

Thank you for your prompt response and your kind email. Your assistance was greatly appreciated.

Kind regards,
Peter

From: McDonald, Laura []
Sent: 05 October 2012 10:30
To: PETER MCCRARREN
Subject: RE: Request permission to use nutrition knowledge questionnaire

Dear Peter,

Thank you for your email and interest in the Nutrition Knowledge Questionnaire. You are welcome to use the questionnaire as part of your research and can access a copy, including the correct answers and scoring information, on the resources page of our website:

<http://www.ucl.ac.uk/hbrc/diet/resources.html>

Good luck with your research.

Best wishes,

Laura

From: PETER MCCRARREN []
Sent: 04 October 2012 20:37
To: Wardle, Jane
Subject: Request permission to use nutrition knowledge questionnaire

Dear Professor Wardle,

I am undertaking a MSc in Exercise and Nutrition Science at Chester University. As part of my dissertation, I hope to conduct a study on the nutritional knowledge of Mental Health Nurses working within the Irish Forensic Mental Health Services and their role in the nutritional care of the patients.

I respectfully request permission to use various questions and parts from the Nutrition Knowledge Questionnaire for Adults (1999), developed by yourself and K Parmenter, in the formulation of my questionnaire to assess the nutritional knowledge of this research population.

Should you have any further questions, comments or suggestions please feel to contact me.

Kind regards
Peter McCrarren

Dear Colleague,

I am currently undertaking a Masters Degree course in Exercise and Nutrition Science at the University of Chester. As part of the requirement for the course, I am engaged in the process of undertaking a piece of research. The proposed title of my study is:

“Irish Forensic Mental Health Nurses Knowledge of Nutrition”

Therefore, it is my intention to distribute a number of questionnaires to mental health nurses working within the service, to to ascertain their current nutritional knowledge. For further details regarding the study, please find enclosed the participant information sheet. Should you wish to be participate in this study, please complete the enclosed questionnaire and return it to myself or alternatively you may leave it in my mailbox at the hospital reception desk by Monday, April 22.

Should you wish to contact me at any stage regarding this study, please feel free to email me at @chester.ac.uk

Yours sincerely

Peter McCrarren

Irish Forensic Mental Health Nurses Knowledge of Nutrition

You are being invited to take part in a research study. It is important that you understand why this research is being undertaken and what it will involve. Please read the following information carefully and discuss it with others if you wish. Please contact me if there is anything that is not clear or if you require more information.

Thank you for reading this.

What is the purpose of the study?

I am a student of University of Chester, and I propose to undertake the project as part of my Masters Degree course in Exercise and Nutrition Science. The purpose of this study is to gain an insight into the level and type of nutritional knowledge possessed by mental health nurses working within the Irish Forensic Mental Health Service. Areas addressed by the study shall include an evaluation of current dietary recommendations, identifying sources of nutrients in our daily diet, the selection of everyday foods to meet dietary requirements and finally looking at the relationship between diet and disease. It is envisaged that the findings from this study will improve the overall diet and nutritional care for patients.

Why have I been chosen?

You are being chosen to partake in this study, as you are a Registered Mental Health Nurse working within the Irish Forensic Mental Health Services and interact with patients on a continuous basis. Being ward-based or working within the Primary Healthcare Clinic or Recreation Department is a necessary prerequisite to partake in this study.

Do I have to take part?

Participation in this study is on a completely voluntary basis. If you decide not to participate, you will not suffer any negative consequences. You may also withdraw from the study at any time without fear of being penalised or forfeiting any of the benefits that you had before entering the study.

What will happen to me if I take part?

If you agree to participate in this study, you are invited to fill in the questionnaire and return it in the enclosed envelope to myself or my mailbox at the main reception desk by **Monday, 22 April**. The questionnaire shall take approximately 15 minutes to complete. You should keep this Participant Information Sheet for your own records.

What are the possible disadvantages and risks of taking part?

There are no anticipated disadvantages, risks or discomforts associated with this study.

What are the possible benefits of taking part?

The primary benefit for the individual mental health nurse participating in this study is that it will provide them with an opportunity to reflect upon their knowledge, practice and attitudes regarding healthy eating and diet patterns among the patients in their care and consider what improvements they could make in further developing and improving their patients dietary intake. In the longer term, the publication of these findings can inform and add to the debate and discussion regarding the factors that can improve mental health patients diet and nutrition.

What if something goes wrong?

If you wish to complain or have any concerns about any aspect of the way you have been approached or treated during the course of this study, please contact Professor Sarah Andrew, Dean of the School of Applied and Health Sciences, University of Chester, Parkgate Road, Chester, CH1 4BJ, United Kingdom, +44 (0)1244 513055.

If you are harmed by taking part in this study, there are no special compensation arrangements. If you are harmed due to someone's negligence (but not otherwise), then you may have grounds for legal action, but you may have to pay for this.

Will my taking part in the study be kept confidential?

Your name/identity is not required to participate in this study. All documents bearing personal information shall be stored in a locked cabinet that only the researcher has access to. Computerised data/information will be password protected and will also be stored in a locked cabinet.

What will happen to the results of the research study?

The results will be analysed and condensed to contribute to a research dissertation as part of my MSc in Exercise and Nutrition Science assessment, and that in time it is envisaged that the findings may be presented at various nutrition/nursing conferences and may be published in a nutrition/nursing journal. Individuals who participate will not be identified in any subsequent report or publication.

Who is organising and funding the research?

I am organizing the research myself in part fulfillment of my Masters Degree course in Exercise and Nutrition Science at the University of Chester. This study is self-funded and has received no external funding

Who may I contact for further information?

You can get more information or answers to your questions about the study, your participation in the study, and your rights, from Peter Mc Crarren who can be emailed at @chester.ac.uk

Thank you for your interest in this research.

Nutrition Knowledge Questionnaire

Section A: This section is about what advice you think experts are giving us

1. Do you think health experts recommend that people should be eating more, the same amount, or less of these foods? (circle **one** answer per food)

	More	Same	Less	Not sure
Vegetables	x	x	x	x
Sugary foods	x	x	x	x
Meat	x	x	x	x
Starchy foods	x	x	x	x
Fatty foods	x	x	x	x
High fibre foods	x	x	x	x
Fruit	x	x	x	x
Salty foods	x	x	x	x

2. How many servings of fruit and vegetables a day do you think experts are advising people to eat? (One serving could be for example, an apple or a handful of chopped carrots)

.....

3. Which fat do experts say is most important for people to cut down on?
(circle one)

(a) Monounsaturated fat	x
(b) Polyunsaturated fat	x
(c) Saturated fat	x
(d) Not sure	x

4. What version of dairy foods do experts say people should eat?

(circle one)

- | | | |
|--|---|---|
| (a) Full fat | x | |
| (b) Lower fat | | x |
| (c) A mixture of (a) and (b) | | x |
| (d) Neither, dairy foods should be cut out | | x |
| (e) Not sure | | x |

Section B: Experts classify foods into groups. We are interested to see whether people are aware of what foods are in these groups.

1. Do you think these are high or low in added sugar? (circle **one** answer per food)

	High	Low	Not sure
Bananas	x	x	x
Natural yoghurt	x	x	x
Ice-cream	x	x	x
Orange squash	x	x	x
Tomato ketchup	x	x	x
Tinned fruit in natural juice	x	x	x

2. Do you think these are high or low in fat? (circle **one** answer per food)

	High	Low	Not sure
Pasta (without sauce)	x	x	x
Low fat spread <input type="checkbox"/>	x	x	x

Baked beans	x	x	x
Sliced Ham	x	x	x
Honey	x	x	x
Chicken goujons	x	x	x
Nuts	x	x	x
Bread	x	x	x
Cottage cheese	x	x	x
Flora margarine	x	x	x

3. Do you think experts put these in the starchy foods group? (circle one answer per food)

	Yes	No	Not sure
Cheese	x	x	x
Pasta	x	x	x
Butter	x	x	x
Nuts	x	x	x
Rice	x	x	x
Porridge	x	x	x

4. Do you think these are high or low in salt? (circle one answer per food)

	High	Low	Not sure
Sausages	x	x	x
Pasta	x	x	x
Kippers	x	x	x
Red meat	x	x	x
Frozen vegetables	x	x	x
Cheese	x	x	x

5. Do you think these are high or low in protein? (circle one answer per food)

	High	Low	Not sure
Chicken	x	x	x
Cheese	x	x	x
Fruit	x	x	x

Baked beans	X	X	X
Butter	X	X	X
Cream	X	X	X

6. Do you think these are high or low in fibre/roughage? (circle **one** answer per food)

	High	Low	Not sure
Cornflakes	X	X	X
Bananas	X	X	X
Eggs	X	X	X
Red meat	X	X	X
Broccoli	X	X	X
Nuts	X	X	X
Fish	X	X	X
Baked potatoes with skins	X	X	X
Chicken	X	X	X
Baked beans	X	X	X

7. Do you think these fatty foods are high or low in saturated fat? (circle one answer per food)

	High	Low	Not sure
Mackerel	X	X	X
Whole milk	X	X	X
Olive oil	X	X	X
Red meat	X	X	X
Sunflower margarine	X	X	X
Chocolate	X	X	X

8. Some foods contain a lot of fat but no cholesterol. (circle **one** choice)

- (a) Agree (b) Disagree (c) Not sure

9. Do you think experts call these a healthy alternative to red meat? (circle one)

answer per food)

	Yes	No	Not sure
Liver pate	x	x	x
Sliced ham	x	x	x
Baked beans	x	x	x
Nuts	x	x	x
Low fat cheese	x	x	x
Quiche	x	x	x

10. A glass of unsweetened fruit juice counts as a helping of fruit. (circle **one** choice)

- (a) Agree (b) Disagree (c) Not sure

11. Saturated fats are mainly found in: (circle one choice)

- a) Vegetable oils
- (b) Dairy products
- (c) both (a) & (b)
- (d) Not sure

12. Brown sugar is a healthy alternative to white sugar. (circle **one** choice)

- (a) Agree (b) Disagree (c) Not sure

13. There is more protein in a glass of whole milk than in a glass of skimmed milk. (circle **one** choice)

- (a) Agree (b) Disagree (c) Not sure

14. Polyunsaturated margarine contains less fat than butter. (circle **one** choice)

- (a) Agree (b) Disagree (c) Not sure

15. Which of these breads contain the most vitamins and minerals? (circle **one** choice)
- (a) White (b) Brown (c) Wholegrain (d) Not sure
16. Which do you think is higher in calories: butter or regular margarine? (circle **one** choice)
- (a) Butter (b) Regular margarine (c) Both the same (d) Not sure
17. A type of oil which contains mostly monounsaturated fat is: (circle **one** choice)
- (a) Coconut oil
(b) Sunflower oil
(c) Olive oil
(d) Palm oil
(e) Not sure
18. There is more protein in a glass of whole milk than in a glass of skimmed milk. (circle **one** choice)
- (a) Agree (b) Disagree (c) Not sure
19. Which one of the following has the most calories for the same weight (i.e. 20g sugar and 20g fibre)? (circle **one** choice)
- (a) Sugar
(b) Starchy foods
(c) Fibre/roughage
(d) Fat
(e) Not sure

20. Harder fats contain more: (circle **one** choice)

- (a) Monounsaturates
- (b) Polyunsaturates
- (c) Saturates
- (d) Not sure

21. Polyunsaturated fats are mainly found in: (circle **one** choice)

- (a) Vegetable oils
- (b) Dairy products
- (c) Both (a) & (b)
- (d) Not sure

Section C: This section is about choosing foods. Please answer what is being asked and not whether you like or dislike the food.

1. Which would be the best choice for a low fat, high fibre snack? (circle **one** choice)

- (a) Diet strawberry yoghurt
- (b) Raisins
- (c) Museli bar
- (d) Wholemeal crackers and cheddar cheese

2. Which would be the best choice for a low fat, high fibre light meal? (circle **one** choice)

- (a) Grilled chicken
- (b) Cheese on wholemeal toast
- (c) Beans with wholemeal toast
- (d) Quiche

3. Which kind of sandwich do you think is healthier? (circle **one** choice)

- a) Two *thick* slices of bread with a *thin* slice of cheddar cheese filling
- (b) Two *thin* slices of bread with a *thick* slice of cheddar cheese filling

4. Many people eat spaghetti bolognese (pasta with a tomato and meat sauce). Which do you think is healthier? (circle **one** choice)
- (a) A *large amount* of pasta with a *little* sauce on top
 - (b) A *small* amount of pasta with a *lot* of sauce on top
5. If a person wanted to reduce the amount of fat in their diet, which would be the best choice? (circle **one** choice)
- (a) Steak, grilled
 - (b) Sausages, grilled
 - (c) Turkey, grilled
 - (d) Pork chop, grilled
6. If a person wanted to reduce the amount of fat in their diet, but didn't want to give up chips, which one would be the best choice? (circle **one** choice)
- (a) Thick cut chips
 - (b) Thin cut chips
 - (c) Crinkle cut chips
7. If a person felt like having something sweet, but was trying to cut down on sugar, which would be the best choice? (circle **one** choice)
- (a) Honey on toast
 - (b) A cereal bar
 - (c) Plain Digestive biscuit
 - (d) Natural yoghurt and banana
8. Which of these would be the healthiest *dessert? (circle **one** choice)
- (a) Apple pie
 - (b) Strawberry yoghurt
 - (c) Custard
 - (d) Cheese-cake
9. Which cheese would be the best choice as a lower fat option? (circle **one** choice)
- (a) Plain cream cheese

- (b) Edam
- (c) Cheddar
- (d) Stilton

10. If a person wanted to reduce the amount of salt in their diet, which would be the best choice? (circle **one** choice)

- (a) Ready made frozen shepherd's pie
- (b) gammon with pineapple
- (c) Mushroom omelette
- (d) Stir fry vegetables with soy sauce

Section D: This section is about health problems and diseases

1. Are you aware of any major health problems or diseases that are related to a low intake of fruit and vegetables?

- (a) Yes
- (b) No
- (c) Not sure

If yes, what diseases or health problems do you think are related to a low intake of fruit and vegetables?

.....
...

.....
...

2. Are you aware of any major health problems or diseases that are related to a low intake of fibre?

- (a) Yes
- (b) No
- (c) Not sure

If yes, what diseases or health problems do you think are related to a low

intake of fibre?

.....
...
.....
...

3. Are you aware of any major health problems or diseases that are related to how much sugar people eat ?

- (a) Yes
- (b) No
- (c) Not sure

If yes, what diseases or health problems do you think are related to sugar?

.....
...
.....
...

4. Are you aware of any major health problems or diseases that are related to how much salt or sodium people eat?

- (a) Yes
- (b) No
- (c) Not sure

If yes, what diseases or health problems do you think are related to salt?

.....
...
.....
...

5. Are you aware of any major health problems or diseases that are related to the amount of fat people eat?

(a) Yes

(b) No

(c) Not sure

If yes, what diseases or health problems do you think are related to fat? .

.....
...
.....
..

6. Do you think these help reduce the chances of getting certain kinds of cancer?
(circle **one** answer for each option)

	Yes	No	Not sure
Eating more fibre	x	x	x
Eating less sugar	x	x	x
Eating less fruit	x	x	x
Eating less salt		x	x
Eating more fruit and vegetables		x	x
Eating less preservatives/additives		x	x

7. Do you think these help prevent heart disease? (circle **one** answer for each option)

	Yes	No	Not sure
Eating more fibre	x	x	x
Eating less saturated fat	x	x	x

Eating less salt	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Eating more fruit and vegetables	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Eating less preservatives/additives	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

8. Which one of these is more likely to raise people's blood cholesterol level?
(circle **one** choice)

- (a) Antioxidants
- (b) Polyunsaturated fats
- (c) Saturated fats
- (d) Cholesterol in the diet
- (e) Not sure

9. Have you heard of antioxidant vitamins? (circle **one** choice)

- (a) Yes
- (b) No

10. If YES to question 9, do you think these are antioxidant vitamins? (circle one answer for each option)

	Yes	No	Not sure
Vitamin A	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B Complex Vitamin	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Vitamin C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Vitamin D	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Vitamin E	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Vitamin K x x x

Finally, we would like to ask you a few questions about yourself

1. Are you male or female?
 - Male
 - Female

2. What age category are you in?
 - 18-28 years
 - 30-41 years
 - 42-53 years
 - 54-65 years

3. What is your job title?
 - Staff nurse
 - CNM1
 - CNM2

4. How many years have you been a qualified nurse?
 - Less than 1 year
 - 1-5 years
 - 6-10 years
 - 11-15 years
 - 16-20 years
 - Over 20 years

5. What is your total length of service within the Irish Forensic Mental Health Services?

- Less than 1 year
- 1-5 years
- 6-10 years
- 11-15 years
- 16-20 years
- Over 20 years

6. What is the highest level of educational attainment you have achieved?

- Certificate
- Diploma
- Degree
- Higher diploma
- Masters

7. Have you received any further training/completed any courses related to nutrition?

- Yes
- No

THE END

Thank you very much for your time. If there are any comments you would like to make about this questionnaire, please do so below, they would be very welcome.

.....

.....

.....

.....

Appendix 8: Original General Nutrition Knowledge Questionnaire For Adults with correct answers

Appendix 9: Amendments made to original General Nutrition Knowledge

Questionnaire For Adults

Section B

Question 1	* Natural yogurt	<i>Unflavored yogurt</i>
Question 2	*Sliced ham	<i>Luncheon meat</i>
	*Chicken goujons	<i>Scotch egg</i>
	*Flora	<i>Polyunsaturated margarine</i>
Question 9	*Sliced ham	Luncheon meat

Section C

Question 8	*Dessert	Pudding
	*Apple pie	Baked apple
	*Custard	Wholemeal crackers and cheddar cheese
	*Cheese-cake	Carrot cake with cream cheese topping

Demographics

8. What age category are you in?
 - 18-28 years
 - 30-41 years
 - 42-53 years
 - 54-65 years

9. What is your job title?
 - Staff nurse
 - CNM1
 - CNM2

10. How many years have you been a qualified nurse?
 - Less than 1 year
 - 1-5 years
 - 6-10 years
 - 11-15 years
 - 16-20 years

- Over 20 years

11. What is your total length of service within the Irish Forensic Mental Health Services?

- Less than 1 year
- 1-5 years
- 6-10 years
- 11-15 years
- 16-20 years
- Over 20 years

12. What is the highest level of educational attainment you have achieved?

- Certificate
- Diploma
- Degree
- Higher diploma
- Masters

Appendix 10: Mean Nutrition knowledge Score and Standard Deviation

Descriptives

		Statistic	Std. Error	
Total Score	Mean	75.99	1.302	
	95% Confidence Interval for Mean	Lower Bound	73.40	
		Upper Bound	78.57	
	5% Trimmed Mean	76.13		
	Median	77.00		
	Variance	161.053		
	Std. Deviation	12.691		
	Minimum	43		
	Maximum	106		
	Range	63		
	Interquartile Range	15		
	Skewness	-.276	.247	
	Kurtosis	.128	.490	