An assessment of the nutritional adequacy and quality of food provided to adult psychiatric patients in public psychiatric hospitals in the Eastern Cape

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ABSTRACT

Introduction: The significant link between mental health and nutrition throughout one's life cannot be overstated. Yet this strong association is often neglected in the public healthcare sector in South Africa, particularly in the case of people who are being treated for various types of mental illness. It is therefore important to prioritise nutrition care through efficient and effective hospital food services in public psychiatric facilities. Although hospital settings are often perceived to provide efficient clinical care, the food provided to patients by hospital food service units is often criticised for being bland, repetitive and/or unhealthy. At times, too, inadequate food budget allocations by provincial health departments or poor supply chain management practices result in patients receiving inadequate quantities of food at mealtimes, which might lead to their becoming malnourished during their hospital stays. For psychiatric patients in particular, malnutrition can have serious short and longer-term consequences.

Aim: The primary aim of this study was to assess the nutritional adequacy and quality of food provided to adult psychiatric patients in public psychiatric hospitals in the Eastern Cape province of South Africa.

Methodology: This study followed a quantitative approach using a descriptive cross-sectional research design. The primary component of the study was a bulk plate-waste study to determine in-patient food intake over a three-day period. Results were then analysed using Food Finder software version 3. Furthermore, the study assessed factors that affect food provisioning, including the knowledge and attitudes of food handlers and nurses' perceptions of the importance of nutrition for psychiatric patients. Relevant information was elicited through interviews, observations and surveys. Data was captured in Excel and analysed using the Statistical Package for the Social Sciences (SPSS) software version 25. A general food service audit was conducted in each hospital to determine the hygiene status of the food service units and the availability of basic hand hygiene infrastructure, which significantly impacted the hospitals' compliance with food safety standards. Chi-square testing was used to assess the association between regulatory compliance and the provision of relevant training to staff, with the result being significant at $p<0.05$.

Findings: In three of the four hospitals, the total energy in the food provided to psychiatric patients was adequate but the provision of essential macronutrients and micronutrients was

below the RDA (recommended dietary allowance) in all four hospitals. Generally, the food was nutritionally inadequate, with the result that some patients faced the risk of malnutrition. Food intake was compromised by various factors, such as food handlers' non-compliance with ration scales, incorrect portioning and poor food combinations. Food waste after consumption, which in some cases might have been due to overproduction, was estimated to be at least 20% in all four hospitals. Inadequate infrastructure, a shortage of food handlers, a lack of relevant training, inadequate basic hand hygiene infrastructure, non-compliance with policies and food safety regulations, and inefficient procurement of food were all seen to be major challenges contributing to the sub-standard food provided by hospital food services, which in turn threatened food safety in the hospitals concerned.

Conclusion: The inadequate provision of energy-rich nutrients, minerals and vitamins in the food provided to patients in the four public psychiatric hospitals in the Eastern Cape is cause for much concern, particularly as it heightens the risk of iatrogenic malnutrition. In the face of these problems, the Eastern Cape Department of Health should prioritise the upgrading of inadequate food service infrastructure, invest in relevant training for food handlers and introduce stricter measures to compel hospitals to comply with relevant laws and regulations in the interests of more efficient, accountable and cost-effective hospital food services.

KEY WORDS

Food handler

Food quality

Food intake

Food provision

Food safety

Hospital food services

Malnutrition

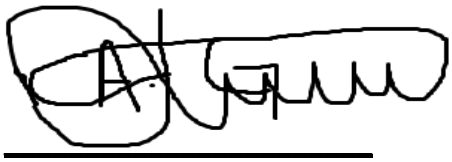
Plate waste

Psychiatric patients

Relevant training

DECLARATION

I, Asanda Getyeza, student number: 3315862, hereby declare that the dissertation titled "An assessment of the nutritional adequacy and quality of food provided to adult psychiatric patients in public psychiatric hospitals in the Eastern Cape" is my own independent work and that it has not been submitted for any degree or examination in any other university, and that all sources I have used or quoted have been acknowledged.



A. Getyeza

2019

DEDICATION

This thesis is dedicated to my mother, Ntomboxolo Getyeza, and my late brother, Siyamila Buyelekhaya Getyeza. It is also dedicated to all the food service personnel in recognition of their tireless efforts to provide an efficient service to in-patients in public hospitals.

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ACRONYMS AND ABBREVIATIONS

ANC	African National Congress
AHEI	Alternative Healthy Eating Index
ASPEN	American Society for Parenteral and Enteral Nutrition
BEE	Black Economic Empowerment
BMI	Body Mass Index
CMF	Contract Management Framework
COA	Certificate of Acceptability
CSD	Central Supplier Database
CVD	Cardiovascular Disease
DALYS	Disability Adjusted Life Years
DoH	Department of Health
DRI	Dietary Reference Intake
ECDC	Eastern Cape Development Corporation
FSM	Food Service Manager
HACCP	Hazard Analysis Critical Control Points
HCUP	Healthcare Cost and Utilization Project
HFS	Hospital Food Services
IBM SPSS	Statistical Package for the Social Sciences
IQ	Intelligence Quotient
ISO	International Organization for Standardization
KAPs	Knowledge, Attitude, Practices
MST	Malnutrition Screening Tool
MUAC	Mid Upper Arm Circumference
NCP	Nutrition Care Process
NDoH	National Department of Health

NRS	Nutritional Risk Screening
PG-SGA	Patient-Generated Subjective Global Assessment
PHFS	Public Hospital Food Services
PPH	Public Psychiatric Hospital
PRPs	Prerequisite programmes
RDA	Recommended Dietary Allowance
RDI	Recommended Dietary Intake
RHAP	Rural Health Advocacy Project
SCM	Supply Chain Management
SES	Socio-economic Status
SOPs	Standard Operating Procedures
WHO	World Health Organization

DEFINITION OF TERMS

Food handler: Anyone who directly handles food packaged or unpackaged in hospital food services or any other food business or school not intended for his or her own personal use (DoH,2010).

Food handling: The process of manufacturing, preparing, storing, packaging and delivering food as well as direct contact with food with one's hands.

Food premises: A structure or place that is used for manufacturing, preparing, dishing, delivery or packaging food.

Food quality: Is the perceived quality characteristics of food that are acceptable to the consumer (Grunert, 2005).

Food safety: The assurance that food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use (DoH, 2010).

Hospital food services: A component/section of a hospital that provides food and beverages to hospitalised patients.

Mealtimes: Any given times at which meals and beverages are eaten.

Standard operating procedures: A set of simplified instructions and guidelines compiled in an organisation to standardize organizational processes and systems with the aim to promote uniformity, quality output and enhance compliance (Edwards & Hartwell, 2006). References for terms.

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CHAPTER 1

INTRODUCTION

1.1 Introduction and background

The objective of public hospital food services (PHFS) is to provide nutritious, microbiologically safe and adequate meals in terms of quality and quantity (Department of Health, 2010). Furthermore, meals must be acceptable, both from a cultural and religious perspective, to all patients admitted to public healthcare facilities.

It is worth noting, though, that the situation with hospitalised patients tends to be rather different. Public hospital food provisioning is often criticised for the quality of meals provided. Yet there is a paucity of documented scientific evidence in this regard. In South Africa, the National Department of Health (NDoH), through its provincial governments, is faced with multifaceted challenges with respect to its public hospital food services (PHFS), ranging from inadequate food quality and acceptability to food that is not nutritious and/or microbiologically safe for hospitalised patients. In addition, a possible factor contributing to malnutrition in patients admitted to hospitals is reduced food intake (Spence, 2017). Poor food intake may be linked to food acceptability among patients. This is influenced by the quality of food prepared by public hospital food services, which includes its appearance, texture and temperature. In this respect, the quality of food produced by hospital food services (HFS) is dependent on the availability of human and financial resources, the adequacy of infrastructure, the degree of compliance with food safety regulations and standard operating procedures, and the availability of periodic training, as well as the knowledge, attitude and practices (KAPs) of food handlers.

While hospital environments are perceived to have vast resources to address public health concerns, such as malnutrition, in both developed and developing countries like South Africa, malnutrition still affects one in three patients during hospitalisation. Malnutrition has adverse effects on patient recovery, and is associated with increased costs of care and longer stays, as well as patient mortality (Wenhold & Faber, 2008). Given the ongoing challenges facing food services, which lead to a decline in the quality of food prepared and poor nutrition, the risk of malnutrition or undernutrition is relatively high.

However, the fact that little investment has gone into upscaling HFS since 1994 has resulted in the quality of food being substandard in many public healthcare settings in the Eastern Cape,

particularly public psychiatric-care facilities. It is for this reason that a growing number of media reports over the past five years have flagged concerns about poor food quality and quantities served to psychiatric in-patients in the Eastern Cape. In addition, the South African government, in its public psychiatric hospitals, has made pocket-size investments in the mental health and nutritional care of psychiatric in-patients. Investment is warranted for research to be conducted in public psychiatric hospitals, focusing specifically on hospital food services and evident awareness of the nutritional needs of psychiatric patients during admission.

The association between diet and mental health is of great significance, from conception all the way through one's life cycle. As cited by Kallivayalil, (2012) in his report on mental health and mental illness, "There is no health without mental health". Similarly, there is no health without a healthy diet. Mental health and good nutrition are inextricably intertwined. When nutrition is inadequate due to an insufficient intake of nutrients, some organs in the body, such as the brain, are affected and as a result mental health is compromised. Adequate nutrition and diet therapy should therefore be recognised as a norm and a cornerstone of mental health intervention in clinical practice guidelines and standards of care for psychiatric patients.

Mental health disorders are the main cause of disability globally (Vigo, Thornicroft & Atun, 2016). More than 17 million (one in every three) people in South Africa are suffering from mental disorders – ranging from depression, anxiety and substance abuse, to bipolar disorder and schizophrenia (Bateman, 2015). Globally, the high prevalence of mental health problems has several potential consequences, including (i) inadequate participation in treatment programmes (Ahmedani, 2011); (ii) those starting treatment not completing the programme (Corrigan, 2004); and (iii) mental health being viewed differently among the different cultures in South Africa. For example, the African culture typically has different perceptions to those of the western culture (Niehaus et al., 2004). While clinical and African traditional methods of treating and managing mental health have been in effect in South Africa for decades (Olatawura, 1978), little attention has been paid to nutrition in this context.

1.2 Problem statement

While much is known about the economics of the private hospital service in South Africa (Erasmus & Kean, 2018), literature on the nutritional adequacy and quality of food provisioning in psychiatric hospitals is rare. The problem of poor nutrition among hospitalised psychiatric patients can be traced back to the asylum seekers in the Eastern Cape during the colonial era (1850s) when malnutrition presented itself in the form of scurvy (Swartz, 1996:

Sukeri & Emsley, 2014). In the Eastern Cape, in the provincial health department's public psychiatric hospitals, substandard infrastructure, a lack of trained food handlers and food service budgetary constraints are some of the challenges that can potentially affect the quality and efficiency of hospital food services.

In a recent study in four hospitals in South Africa, it was found that 72.3% of patients were malnourished (42.8% regarded as high risk and 24.1% regarded as medium risk) based on the mid-upper-arm circumference (MUAC) in a study conducted in two public general hospitals in South Africa (Van Tonder et al., 2019). Although the onset of malnutrition may be caused by conditions unrelated to dietary intake, such as malabsorption syndromes like diarrhoea, steatorrhea and bloating, the primary mode of malnourishment is dietary intake; yet this often goes unnoticed in hospitalised patients (Furman, 2013).

1.3 Aim and objectives of the study

1.3.1 Aim of the study

The aim of this study was to evaluate the nutritional adequacy and quality of food provided to adult patients in public psychiatric hospitals (PPHs) in the Eastern Cape.

1.3.2 Research objectives

To achieve the aim of this study, the following specific objectives were formulated:

- To determine and evaluate adult patient food intake over three consecutive days through a plate-waste study in the four public psychiatric hospitals in the Eastern Cape;
- To determine the factors associated with food provisioning and intake among adult in-patients in public psychiatric hospitals in the Eastern Cape;
- To assess the knowledge, attitude and practices (KAPs) of food handlers in terms of food handling and preparation in public psychiatric hospitals in the Eastern Cape;
- To explore the perceptions of staff in terms of the nutritional needs of psychiatric patients.

1.4 Research questions

This study set out to answer the following research questions:

- What is the nutritional adequacy of food provided to adult psychiatric patients in the four psychiatric hospitals in the Eastern Cape?
- What factors contribute to food provisioning and intake among adult psychiatric patients in the four psychiatric hospitals in the Eastern Cape?
- What are the knowledge, attitude and practices (KAPs) of food handlers in terms of the quality of food provided by hospital food services to hospitalised psychiatric patients?
- What are the perceptions of staff working in psychiatric hospitals in terms of the nutritional needs of psychiatric patients?

1.5 Significance of the study

This study will contribute to an understanding of the quality of food prepared by HFS and the factors that affect the provision of an efficient service by HFS, as well as the areas needing redress. Furthermore, this study will identify the primary challenges encountered daily by food service personnel in their endeavours to render quality meals that are microbiologically safe. The knowledge gained from this study may inform food service managers, the provincial Department of Health and institutional management on the nutritional needs of the psychiatric patients, the efficacy of food service systems, and the optimal allocation and management of resources in the food service units.

1.6 Scope and delimitation of the study

The findings of this study cannot be generalised to a larger population; therefore, the research cannot be deemed to represent all public psychiatric hospitals in South Africa. Another limitation was the time available to conduct the study. Therefore, regarding future research, longitudinal studies are warranted.

1.7 Outline of the thesis

Chapter 1 provides the background to, and the aim and objectives of the study. Chapter 2 reviews the relevant literature, while Chapter 3 describes the methodology used. Chapter 4 presents the study's findings. Lastly, Chapter 5 presents the final discussion, conclusion and recommendations drawn from the study.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter is split into three sections. The first section deals with (i) the history of nutrition care in psychiatric hospitals in the Eastern Cape Province during the colonial era; (ii) a review of common mental health disorders with the emphasis on the risk factors associated with mental health; and (iii) perceptions surrounding mental health illness. The second section presents a review of the literature that unpacks the relationship between nutrition and mental health. The last section reviews the literature that focuses on factors that affect hospital food provisioning in public psychiatric hospitals.

2.2 Theoretical framework

In an effort to assess the nutritional adequacy and quality of food provided to adult psychiatric patients in public psychiatric hospitals in the Eastern Cape, the study applied the theory of compromised eating behaviour.

2.2.1 Theory of compromised eating behaviour

The theory of compromised eating behaviour, which seeks to describe the social processes that influence the eating behaviour of hospitalised, older adults (Furman, 2013), was adopted for this study. Furman (2013) suggests that despite the availability of vast resources within the hospital environment, hospitalised adults have an inadequate dietary intake. The theory of compromised eating behaviour further suggests that hospitalised, older adults may compromise their health by failing to eat adequately. Moreover, Furman (2013) asserts that older adults are at risk of experiencing negative health outcomes due to inadequate dietary intake during hospitalisation. However, the theory of compromised eating behaviour affirms that intervention in the form of enhancing food quality and mealtimes for older adults during hospitalisation may improve their dietary intake and nutritional outcomes. The theory takes the view that despite the availability of resources within the hospital environment, hospitalised, older adults may be at risk of an inadequate diet (Furman, 2013).

In contrast, the theory of compromised eating behaviour also suggests that some older adults may be admitted to hospital in a state of undernutrition, with some of these individuals possibly becoming more undernourished and others becoming more nourished during hospitalisation.

This differs with each patient depending on how strong or weak the immune system of each patient is and whether the admitted patient finds hospital food acceptable or not.

2.2.2 Quality health outcomes model (QHOM)

Similarly to the theory of compromised eating behaviour, is the quality health outcomes model (Figure 2.1) which is patient focused and used to evalute overal process of patient care as well as identify dynamics that affect patient outcomes. The similarity between the theory of compromised eating behaviour and the quality health outcomes model is improved patient care through improved systems, structures with the target of achieving positive health outcomes. This model builds from the Donabedian's 1996 framework and reflects on the dynamics among various components of the systems of care. The quality outcomes model is primarily inteded to be closely aligned with the dymanic process of patient care and outcomes (Mitchell, Ferketich & Jennings, 1998). Further this model recognises the feedback that occurs among clients (Mitchell et al., 1998) for example through patient satisfaction surveys and general patient feedback, the system or context in which care is provided and interventions applied thereafter.

Patient care for the purpose of this study may include clinical care which includes nutrition care during long term hospitalization of psychiatric patients in public health care hospitals. Outcomes of both treatment interventions or technology assessment, have been described as negative outcomes and are termed as the "Five D's" namley: death, disease, disability, discomfort and dissatisfaction (Mitchell et al., 1998). These "Five D's" led to the urgent identification and recognition of positive outcomes such as improved health status, functional ability and perceived quality of life as roughly measured by various health related quality-of-life scales (Mitchell et al., 1998).

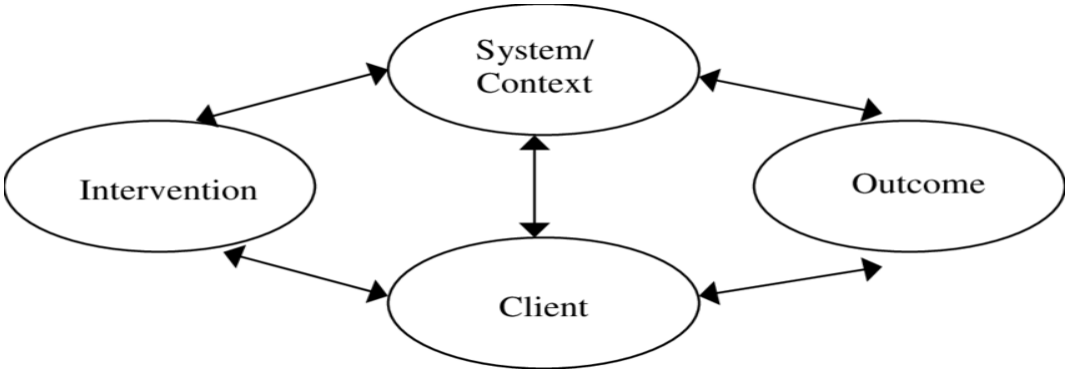

Figure 2.1: Quality Health Outcomes Model (Mitchell, Ferketich & Jennings, 1998:44)

2.3 History of undernutrition in psychiatric hospitals

The manifestation of malnutrition in the form of undernutrition in psychiatric healthcare institutions in South Africa was recorded in the era of asylums and may have been due to poor nutrient intake. For example, the rationalised spending on native patients resulted in many patients in the Fort Beaufort asylum developing scurvy (Swartz, 1996), a disease caused by a severe and chronic vitamin C deficiency. Both poor nutrition and the emergence of tuberculosis in the Fort Beaufort asylum may have been attributable to the inadequate food budget allocation compared to other asylums in South Africa at the time. For example, the Valkenberg asylum in Cape Town (now known as Valkenberg Hospital) spent £7480 per annum on a daily average of 410 patients, while the Fort Beaufort asylum spent £6535 per annum on a daily average of 475 patients (Swartz, 1996; Sukeri & Emsley, 2014).

2.4 History of psychiatric hospitals in the Eastern Cape

The phenomenon of mental hospitals in the Eastern Cape dates back to the 1800s. Military barracks or prisons in the Eastern Cape were converted to mental hospitals, with the first being the Grahamstown Lunatic Asylum in 1875 (Swartz, 1996), now referred to as Fort England Hospital. Owing to overcrowding by both white and native patients, a natives-only mental asylum was established in Fort Beaufort military barracks in 1894, which is today known as Tower Hospital and Rehabilitation Centre. One of the major challenges facing the (then) asylums was overcrowding, which led to expansions being done to accommodate more patients. At the Fort Beaufort asylum, the problem of limited accommodation was addressed by creating an open-air space to build and provide accommodation for 10 male patients who presented with tuberculosis symptoms. As years passed, the need for mental health services increased and in 1922 Queenstown Hospital (Komani Mental Health Hospital) was established to accommodate both white and native mentally ill patients in racially segregated sections of the hospital. According to Sukeri and Emsley (2014), Port Elizabeth's Elizabeth Donkin Hospital was converted into a psychiatric hospital in 1969, having originally been established in 1937 as an infectious diseases hospital.

The poor state of psychiatric care in the Eastern Cape continued until the current government of the African National Congress (ANC) came to power in 1994. Having inherited a fragmented mental health system, the government was mandated to scale up mental health and general public healthcare operations in South Africa. This scaling up resulted in several new developments, such as the review of hospital food services, the amalgamation of different

administrations in all provinces, the conceptualisation and implementation of the Mental Health Act of 2002 and the Policy for Food Service Management in Public Health Establishments (Department of Health, 2010), as well as the establishment of several psychiatric bodies, such as the South African Society of Psychiatrists, the South African Federation for Mental Health and the South African Depression and Anxiety Group, all of which still exist today.

2.5 Factors associated with mental illness

Mental health disorders are a significant public health concern and are among the important causes of morbidity in primary care settings, while also producing considerable disability (Vigo, Thornicroft & Atun, 2016). Although mental health disorders are often disregarded as diseases, the burden of diseases and disability for mental health disorders is estimated to account for approximately 12% of disability-adjusted life years (DALYS) globally and 31% of all years lived (Vigo et al., 2016) across all ages and for both sexes (Sareen et al., 2007). The high prevalence of mental health disorders globally and the pressure exerted by the disorders on countries' social, economic and health systems are significant and cannot be ignored. In the African context, mental health disorders are often perceived as spirit possessions and associated with witchcraft (Mbanga et al., 2002). Socially driven beliefs, including a lack of knowledge, negative attitudes and the perceived stigma of mental disorders, may result in sufferers eschewing the opportunity to receive medical treatment (Schulze & Angermeyer, 2003).

2.5.1 Genetic predisposition

A genetic predisposition is defined as an increased likelihood of developing a disease based on the person's genetic makeup (Motulsky, 1992). Genetic predisposition is the result of specific genetic variations that are often passed down from a parent to their offspring, as well as environmental influences. These genetic changes contribute to the development of a disease; however, they do not necessarily cause the disease (WHO, 2019).

A child born of a parent or parents with a mental illness is at a greater risk of developing a mental illness (Mattejat & Remschmidt, 2008). Even though a person's genetic makeup cannot be altered, lifestyle factors and environmental modifications, including maintaining a healthy weight and having frequent disease screenings, may help to reduce the disease risk in someone with a genetic predisposition (Yoon et al., 2002). Having a genetic predisposition to mental health disorders does not imply that a child born of a mentally ill mother will develop a mental

disorder. However, having a genetic predisposition to disorders does weaken resistance to stresses suffered during puberty, and without the ability to recover from past stresses and traumas, a mental disorder may be triggered (Nabeshima & Kim, 2013).

2.5.2 Prenatal and postnatal experiences

The prenatal period has a significant impact on physical, mental and cognitive outcomes in the early years and throughout life (Swart, Sanders & McLachlan, 2008). The World Health Organization (2016) has long been aware that a mother's health is particularly important for the health of the unborn child. Poverty is associated with pre-term delivery which, in turn, is associated with adverse cognitive outcomes (Brumberg & Shah, 2015). In addition, poor health outcomes such as undernutrition, particularly in the first 1000 days of life (Du Plessis, Naude & Swart, 2016), can have irreversible, negative ripple effects on illness and disability and the transmission of poverty from one generation to another (Swart et al., 2008). In this respect, the mother's exposure to poverty, poor living conditions and poor dietary intake poses a risk to the cognitive development of an unborn child and adds to the risk of mental illness throughout their life cycle. Health and nutritional status have an impact that extends beyond childhood, affecting development and productivity later in life (Swart et al., 2008).

2.5.3 Poverty and mental health

Mental illness and poverty are closely linked and interact in a complex, negative cycle throughout one's life cycle (Lund, 2012). Many of the causes and triggers of mental disorders can be found in the social, economic and political spheres and in the conditions of daily life (Karban, 2016). In addition, mental healthcare disparities have resulted in the populations of many African countries becoming increasingly susceptible to mental illness, due to the greater prevalence of socio-economic risk factors. These factors may include poverty, social inequality, war and conflict, disasters, urbanisation and migration (Monteiro, 2015). Figure 2.2 by (Chilton and Booth, 2007) shows the link between poverty, food insecurity, hunger and poor health.

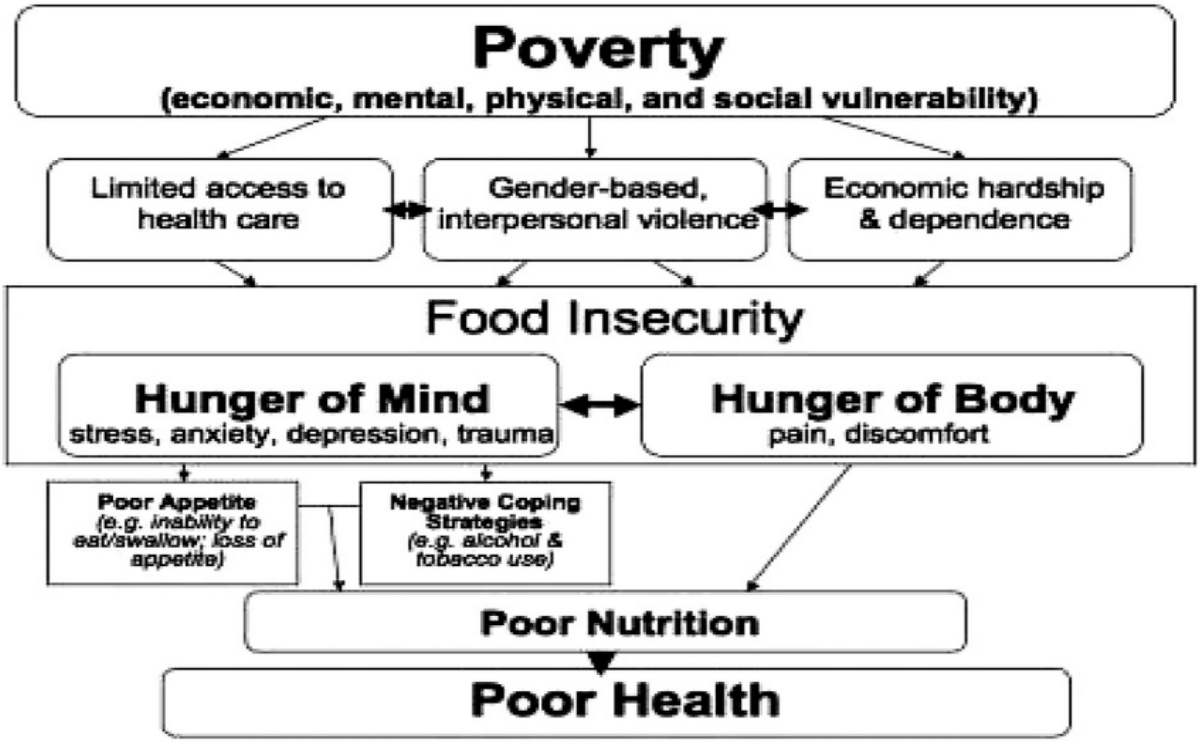

Figure 2.2: Conceptual framework for hunger of body and hunger of mind (Chilton & Booth, 2007:123)

Poverty increases the risk of mental health problems and can be both a cause and a consequence of mental ill health (Wickham et al., 2017). As reported by Murali, & Oyebode (2004), people from low socio-economic groups are eight times more at (relative) risk of developing schizophrenia than those from high socio-economic groups. Childhood poverty and socio-economic inequality have long-term health implications, which carry through into later life. For example, low childhood socio-economic status is associated with chronic diseases, poor mental health and unfavourable health behaviours in adulthood. Growing up in poverty is associated with toxic stress, which can influence child development and mental health (Jensen, Berens & Nelson, 2017).

2.5.4 Severe hunger and mental health

Poverty is aggravated by various factors such as limited access to health care, gender based interpersonal violence as well as economic hardship and dependence, can manifest itself in various forms (Chilton and Booth, 2007) such as hunger of the mind and hunger of body. Hunger of the mind, which can be identified as stress, anxiety, depression and trauma (Figure 2.2). Hunger relates to the scarcity of food in a particular country or community. It is a leading cause of malnutrition and a threat to public health (Bain et al., 2013). Severe hunger is

associated with anxiety and depression in children; thus, hunger is a good predictor of depression and suicidal ideation during late adolescence and young adulthood (Weinreb et al., 2002). Exposure to severe hunger and a disturbed sugar balance can manifest as depression (Hellemans et al., 2010).

2.5.5 Environmental factors

The interaction between genetics and environmental factors influences many aspects of human development. According to Nabeshima and Kim (2013), only 30–40% of bipolar cases involve a genetic factor. Environmental factors play a more significant role in the development of depression, which in this respect implies that society should create supportive, friendly and enriched environments that promote resistance and resilience to stress.

2.5.6 Perceptions about mental illness

Clinically, mental illness is perceived as a psychologically related disorder, managed and treated by following the western medical approach. Clinical psychiatric knowledge was discovered during the early nineteenth century and was relied upon up to the middle of the 1930s. According to Minde (1976), psychiatric knowledge advanced in terms of treatment and management during the 1930s. At the time, South Africa was noted for its use of sedatives and insulin coma therapy for the treatment of schizophrenia, and cardiozol and electroshock treatment for both manic-depressive psychoses and schizophrenia. More recently, psychiatric knowledge has increased significantly in South Africa, with great strides having been made in the pharmaceutical field in the development of effective, scientifically proven medication to treat and manage mental health disorders.

However, in an African context, mental illness is perceived as an ancestral spirit possession and is part of the belief systems of the Zulu and the Xhosa cultures of South Africa (Sorsdahl et al., 2010). In the Zulu culture, the intimate relationship between the living and the dead is revealed through the importance attached to the concepts of the soul (umphefumlo), the spirit (umoya) and the shadow (isithunzi), and the ancestral shades' brooding (ukufukamela) over the lives of their descendants. There is a strong belief in some African cultures that unless appropriate rituals are performed, the brooding can lead to misfortune, illness, mental illness and vulnerability to various ecological hazards, such as lightning, sorcery and witchcraft (Edwards et al., 2009).

Mental illness is often perceived as ukuthwasa and amafufunyana. Ukuthwasa and amafufunyana are classified as culture-bound syndromes which refer to any one of a number of recurrent, locally specific patterns of behaviour and experiences that appear to fall outside conventional western psychiatric–diagnostic categories (Niehaus et al., 2004). Ukuthwasa is recognised as a calling to serve the wishes of the ancestors by becoming a traditional healer, suggesting that it a special and normal event in a cultural sense (Sorsdahl et al., 2010). Amafufunyana is seen as a hysterical condition characterised by people speaking in a strange, muffled voice in a strange language which at times cannot be understood (Niehaus et al., 2004) or in a muffled voice that is not of the patient. Other symptoms include people throwing themselves on the floor, tearing clothes, hurting themselves through violent acts and possibly committing suicide (Sorsdahl et al., 2010), undressing, and behaving aggressively and unpredictably (Niehaus et al., 2004). Another suspected manifestation of a mental illness is someone engaging in witchcraft (Edwards et al., 2009).

Though calling may be accepted, and cultural rituals performed, in going through the phases of ukuthwasa, not all initiates become fully-fledged izangoma. Complete healing or future vocations are not assured, and many psychiatric patients often direct their illness to incomplete calling (Edwards et al., 2009). However, compliance with the ancestral calling confers special powers, such as healing and prophetic powers, whereas resistance to the divine calling by the ancestors may lead to an illness called ukuphambana (loss of sanity – a mental disorder) (Sorsdahl, 2009).

Mental illness in the African context is managed and treated by traditional healers using traditional medicine. According to Sorsdahl et al., (2010), mental illness in the form of amafufunyana is treated by using a mixture consisting of toxic chemicals such as methylated spirits and benzene (highly flammable liquids), and indonya which is a traditional herb combined with Epsom salts, vinegar and grated synadenium which is also referred to as the dead man's tree. Another form of treatment used in the African culture to prevent mental illness is accepting the ancestral calling and becoming a traditional healer (Sorsdahl et al., 2010). Within these cultural perceptions, the nutritional needs of patients do not feature. However, research has shown that there is a strong association between diet and mental health when managing common mental health disorders.

Stigma and discrimination towards the mentally ill are complex issues. According to Semrau et al., (2015), stigma stems from ignorance and ingrained attitudes and behaviour which

manifest as negative responses directed at a certain group in society. People with mental health disorders are among the most vulnerable marginalised groups in society (Priebe et al., 2012). Societal stigma limits the opportunities available to people with serious mental health illnesses. Stigma extends to the institutions, healthcare workers and even mental health specialists providing treatment and care (Monteiro, 2015). Quinn & Earnshaw (2013) asserts that stigma is corrosive in nature as it can be internalised.

Self-stigma is often equated with perceived stigma, a person's recognition that the public is prejudiced and will discriminate against them because of their mental illness (Elliot, 2016). Poor self-efficacy and low self-esteem have also been associated with those affected not taking advantage of available opportunities that promote employment and independent living (Corrigan, Druss & Perlick, 2014).

2.6 Prevalence of undernutrition in adult in-patients

Globally, the prevalence of malnutrition among hospitalised patients is very high, reportedly ranging from 20% to 60%. It is estimated that malnutrition affects at least one in three patients in developing countries because of a lack of resources (Chamblee et al., 2017). In South Africa, there is limited data on the nutritional status of hospitalised patients in both general and psychiatric public hospitals. Among those patients who are not malnourished at the time of admission, it is estimated that one in three may become malnourished during their hospital stay.

Van Tonder et al., (2019) reported that 72.3% (42.8% regarded as high risk and 24.1% regarded as medium risk) of patients were malnourished based on the mid-upper-arm circumference (MUAC) measured in two public hospitals in South Africa. Furthermore, iatrogenic malnutrition often goes unnoticed in hospitalised patients (Van Tonder et al., 2019). This could be due to inadequate training or knowledge to calculate patients' body mass index (BMI) or percentage weight loss or (in the case of clinicians) to perform nutritional screenings (Van Tonder et al., 2019). Risks associated with unaddressed malnutrition in hospitalised patients include delayed recovery and prolonged hospital stays, an increased risk of morbidity and mortality, and higher hospital costs (Cereda et al., 2013).

Nutrition screening has been defined by the American Society for Parenteral and Enteral Nutrition (ASPEN) as "a process to identify an individual who is malnourished or who is at risk for malnutrition to determine if a detailed nutrition assessment is indicated" (Mueller et al., 2011). The nutrition care process (NCP) is designed to provide a standardised process of

providing nutrition care to in-patients (Hakel-Smith, Lewis & Eskridge, 2005). An accurate nutritional screening at the time of diagnosis and admission and throughout the patient's treatment fosters better control of the illness. Several screening tools have been identified and proven to be useful for malnutrition screening (Castillo-Martínez et al., 2018).

Nutritional risk screening (NRS), the malnutrition screening tool (MST), the short nutritional assessment questionnaire, the patient-generated subjective global assessment (PG-SGA) and the mini-nutritional assessment are the most commonly recognised screening tools (Hakel-Smith et al., 2005; McCarthy et al., 2012). The availability of resources and the capacity of nurses to conduct a nutritional evaluation, such as calculating body mass index and detecting malnutrition based on the MUAC, as well as institutional management support contribute to the successful early detection of malnutrition. Conversely, a lack of resources to conduct nutrition assessments on hospitalised patients may result in late detection of malnutrition. Nutritional screening must be completed at the time of admission and should thereafter be a continuous exercise (Figure 2.3).

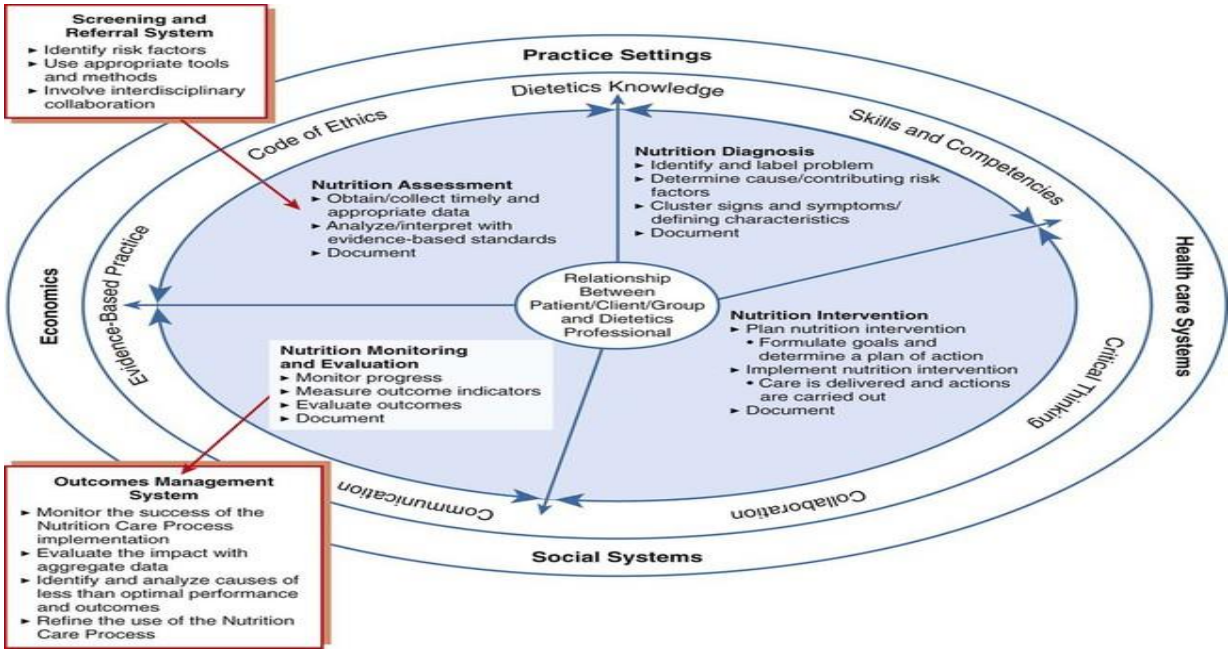

Figure 2.3: The four main steps of the nutrition assessment care process (Lacey & Pritchett, 2003:1062)

In order to provide adequate nutritional support to hospitalised patients, a close collaboration between stakeholders (food, dietetic, nursing, clinical and support services) is necessary.

Clinical component, particularly nursing services and food services may not work in isolation from one another. A lack of cooperation between the different stakeholders in a hospital can have poor or negative outcomes for the health of the patient (Beck et al., 2001). In a recent study on patient perceptions of a general hospital stay, it was reported that patients' perceptions were directly linked to the quality of food and the overall food service experience during hospitalisation (Stanga et al., 2003).

Despite the Department of Health being aware of adult malnutrition in hospitals, nutritional evaluation on admission is not a routine practice in South Africa's public healthcare sector. This is due to a lack of resources to conduct nutritional screening and assessment.

2.7 Plate-waste studies to determine patient food intake

Hospital food has a reputation for being unappetising (Edwards & Hartwell, 2004). Food consumption levels in public healthcare settings are below the recommended intake, which results in food wastage from the plates of in-patients (Williams & Walton, 2011). Studies aimed at identifying the factors contributing to the low food intake by hospitalised patients have revealed that food temperature, visual presentation and patient perceptions of the food were some of the factors that food services and management need to focus on when preparing hospital meals for patients (Dall'Oglio et al., 2015). One of the life-threatening potential consequences of low consumption of food provided by hospital kitchens is mortality, while lengthy hospital stays add significantly to the health budget. Proper investment in hospital food could potentially produce long-term financial savings in the health sector (Spence, 2017).

To assess patient food intake and the nutritional adequacy of meals in hospital settings, plate-waste studies are crucial. These studies are used to determine the amount of food that remains uneaten on patients' plates after a meal (Williams & Walton, 2011). The benefits of plate-waste studies on hospital food services include: (i) they are effective determinants of the level of acceptance of food served to in-patients; (ii) they provide an indication of the strengths and weaknesses of the menu options available to patients; and (iii) they allow the identification of patients who have not eaten their food (Williams & Walton, 2011).

2.8 Relationship between nutrition and mental health

In a study by Rahmani et al. (2018), a strong association between unhealthy eating guidelines and mental disorders was reported. In another study conducted among Iranian military personnel, it was reported that there is an inverse association between adherence to the

Alternative Healthy Eating Index (AHEI-2010) and the odds of depression and anxiety (Rahmani et al., 2018). Previous studies have linked poor diet to psychological disorders. The Alternative Healthy Eating Index of 2010 is a new, valid and reliable measure of diet quality according to the 2010 dietary guidelines (Rahmani et al., 2018). Good nutrition boosts the capacity of an individual to adapt to the stresses of life (McEwen, 2012) and contributes to improved mental clarity, moods, concentration, sleep patterns and resistance to infections.

The meta-analysis of observational studies has shown that a healthy diet and a Mediterranean diet are associated with a lower risk of depression (Knight, 2018). A Mediterranean diet not only demonstrates health benefits, but it is also highly palatable and thus more likely to become a sustainable part of a healthy lifestyle. However, evidence from recent studies has highlighted the fact that people with a mental illness have a poor diet and other unsavoury lifestyle behaviours that impact their health, as well as less understanding of the impact of such behaviours on health (Opie et al., 2017).

Deficiencies in both macro- and micronutrients have been associated with increased behavioural problems. In this regard, nutritional supplementation has proven efficacious in the treatment of certain neuropsychiatric disorders, such as depression (Raju, 2017). The body requires sufficient energy–metabolic processes, physiological functions and synthesis of new tissues. Raju (2017) defines energy as the total energy content of foods consumed, as provided by the energy-yielding nutrients of carbohydrates, protein and fat (Table 2.1).

Table 2.1: Recommended energy and energy-yielding nutrients

Nutrient	Adults 23–55years	Elderly (older than 55 years)	TB adult
Energy (kJ)	6300–8400kJ	5376–6426kJ	6960–12 000kJ
Carbohydrates (g)	206–272g	176–210g	136–287g
Protein (g)	56–99g	50–63g	54–115g
Fat (g)	41–55g	20–27g	36–76g

Dietary Reference Intakes (DRIs) (Otten, Pitzi Hellwig & Meyers, 2006)

2.9 Food provisioning in public healthcare

Public food service provision in the South African healthcare sector is not a well-researched domain and therefore there is limited literature on this topic. The growing number of reports of poor food quality and quantities served in public psychiatric hospitals by in-house food services is therefore of great concern. The literature suggests that food provisioning was already in existence in public psychiatric hospitals in the (then) asylums in the 1800s. Be that as it may,

the procurement guidelines and nutrition regulations in effect at the time that the current study was conducted were still unclear. Nevertheless, food provisioning in South Africa has seen a major transition in terms of regulations, policies and financial assistance to improve quality-standard outcomes. These outcomes include the prevention of nutrition-related diseases and the provision of meals that are nutritionally adequate and of an acceptable quality to in-patients. While shortcomings are still in evidence, the progress made by public hospital food services since 1994 should not be overlooked.

The valuable efforts made to improve food services in the Eastern Cape include but not limited to: (i) an increase in the number of food service manager posts created since 1994; (ii) the establishment of food service aid posts; (iii) the provision of new industrial food service equipment in some hospitals; (iv) an increase in financial resources, such as a larger groceries budget; and (v) the establishment of a provincial food service menu to ensure adequate provision of meals to admitted patients (DoH, 2010).

2.10 Significance of hospital food services

In a hospital setting in particular, maintaining the nutritional status of a patient through the provision of nutritious and adequate food and beverages by hospital food services is essential, and is of significance in supporting patients' well-being and recovery from illness. According to Beck et al. (2001), hospital management generally does not consider food services to play a significant role in the service that the hospital provides. Beck et al. (2001) allude to the fact that food services are not always seen as an important therapeutic aspect of patients' experience during their hospital stay. In addition, food services are usually grouped with general facilities (support services) rather than patient-treatment services.

Those involved in food provisioning in South African public hospitals are recognising the right to adequate nutrition as enshrined in Section 27 of the Constitution (South African Constitution, 1996). The primary aim of hospital food services is to provide nutritional support to in-patients in all South African public hospitals. In light of this aim, the objectives of hospital food services can be summarised as follows: (i) the provision of meals that are nutritionally adequate; (ii) the supply of meals that are adequate in terms of quality and quantity; and (iii) the provision of meals that are culturally acceptable to all those admitted to public healthcare facilities.

Nutritional support to which a patient is entitled during hospitalisation is the responsibility of all stakeholders (nurses, administration clerks, psychiatrists, food services units, human resources, procurement officers) who should ensure a safe and healthy environment. This is because the process of providing efficient, quality care to in-patients is dependent on many different aspects of a hospital's operation. Specifically, no patient-care process can achieve successful outcomes in isolation from other processes. For example, if an in-patient is not assessed for individual nutritional needs during admission and for the duration of their hospital stay, and communication with the food services component is not effective, the food services unit will be unable to provide meals that meet the individual patient's nutritional needs. This may lead to patients' malnutrition and a prolonged hospital stay (Kim et al., 2012).

A certain percentage of a government's budget is allocated to the treatment and management of mental illnesses. In South Africa, less than 1% of the health budget is invested in mental health, leaving the majority of affected individuals to fend for themselves (Rural Health Advocacy Project, 2015). In 2015, provinces spent only a tiny proportion of their budget on mental health (RHAP, 2015), even though neuropsychiatry disorders are now ranked third in terms of their contribution to the burden of disease in South Africa (Vergunst, 2018). During the 2015/2016 financial year, South African provinces spent an estimated 2.9% of their total budget on psychiatric facilities. In the same period, the Eastern Cape Department of Health spent 3.17% of their budget on psychiatric hospitals, with the North West province spending the most (4.61% of their budget) of all nine provinces. In contrast, Mpumalanga spent the least (only 0.37% of their budget) on psychiatric hospitals (Daniels, 2018).

Factors contributing to the mental healthcare disparities evident in Africa include individual and community-level challenges, such as the low priority they are afforded by government and the lack of a clear mental health policy. Other challenges associated with mental healthcare in Africa are poor health infrastructure and underutilisation of available budget allocations; insufficient numbers of trained specialists; a lack of evidence-based, culturally aligned assessments and treatment; stigma and discrimination; and human rights abuses (Monteiro, 2015).

2.11 Public hospital food services in South Africa today

Following South Africa's transition to democracy in 1994, provinces had to amalgamate their administrations with those of the former apartheid government, which had different guidelines, manuals and policies for various food service units. Similar to the South Australian Health

Department in 2008/2009, the South African government commissioned a consultant in 1999 to conduct a holistic review of food service systems and administration in public institutions. This was with a view to improving the (then) substandard quality of such systems and administration.

A comprehensive report was presented to the National Department of Health recommending the up scaling of national food service systems and administration. Among its key findings were: (i) an inadequate food service budget allocation within institutions; (ii) financial loss due to the high incidence of food theft and utensils, such as crockery; (iii) limited availability of food service equipment as well as faulty equipment; (iv) a lack of skilled food service personnel; (v) non-compliance by contracted suppliers with specified requirements; and (vi) high levels of food wastage. Hospital food services in South Africa continue to be an under-budgeted and under-resourced component of healthcare, resulting in the deterioration in, and substandard quality of, food services and the provision of unacceptable, poor-quality food to in-patients.

2.11.1 An overview of the significance of hospital food services

Hospital food service managers occupy leadership roles in public healthcare establishments (Goeiman, Labadarios & Steyn, 2011). They perform administrative tasks, maintain operational standards, ensure compliance with and the implementation of regulations and food service policies, engage in people management, control the budget and ensure the correct procurement of food, and ensure the availability of foodstuffs at all times. Food service managers also plan menus with the assistance of dieticians, draft food specifications, engage in contract management, and perform recruitment and selection of staff for vacant positions.

2.11.2 Significance of food handlers in quality hospital food services

The responsibility of food handlers in public healthcare is of great importance as they provide meals to mostly patients with low immunity. Food handlers have the responsibility of ensuring that meals prepared in hospital food service units are free of contamination by pathogenic bacteria (Bertin et al., 2009), which is potentially harmful and could lead to mortality. However, for food handlers to attain the goal of providing quality, nutritious and safe meals, various factors need to be taken into consideration, not least of which is investment in training and development. Essential elements include: (i) sufficient resources, such as equipment; (ii)

adequate staffing; (iii) a conducive working environment; (iv) periodic training; and (v) the development of managers' administrative and leadership skills.

2.12 Factors affecting food quality in public hospital food services

Drawing on international literature, it can be seen that various factors affect the quality of food produced in public hospital food service facilities, although they have common effects on the overall quality and performance of food services. Such factors include financial resources, staff allocations (Musyoka, Ochieng & Nzioki, 2016), supply chain management (Kanyoma et al., 2013), the recruitment of food service personnel, the availability of relevant training and the implementation of food quality standards (Kibe & Wanjau, 2014).

2.12.1 Availability of resources

In the planning of the nutritional care of patients, the availability of resources such as financial and human resources, infrastructure and institutional management support determines the quality and performance of an organisation. Human resources have been described as "the heart of the health system in any country", the most important aspect of a healthcare system. Human resources constitute the crucial core of a health system, but they have been a neglected component of health system development (Hongoro & McPake, 2004). In South Africa, a host of resources are inadequate, including the food service budget in some hospitals, infrastructure and equipment, and there is a lack of skilled food service personnel (DoH, 2010)

2.12.2 Employee training and development

South Africa's Skills Development Act 1998 aims to improve the delivery of social services by providing employees with the opportunity to acquire new skills and encouraging employers to use the workplace as an active learning environment. However, it is not simply the provision of training that is the challenge; rather, the challenge lies in the provision of training that is relevant to the core job functions. In the case of food services, the unavailability of relevant training on the implementation of food quality standards, such as ISO 22000 and Hazard Analysis Critical Control Points (HACCP) as well as prerequisite programmes (Kibe & Wanjau, 2014) may be a factor impacting the quality of food produced in public hospitals and the morale of public hospital food handlers.

Employees are like raw materials in some respects. Like raw materials, they must be processed so that they can perform their tasks adequately and successfully and can fit into their work

groups and the organisation as a whole (Kaston, 2018). Trained employees have greater potential than untrained employees to perform effectively on the job and contribute to the quality of service delivery.

Training is important for enhancing the capabilities of employees and is an effective way of motivating staff and improving morale, which can be observed in how staff perform their duties (Khan, Khan & Khan, 2011). Furthermore, Khan et al. (2011) assert that training not only contributes positively to staff members' personal development, but also benefits organisational performance. Pre-training of employees is deemed a strategy aimed at encouraging compliance with departmental policies and regulations pertaining to the core content of a job. Ultimately, employee training not only enhances the quality of the service to be rendered but also has the benefit of improving staff morale, attitudes and compliance with agreed practices.

There can be periodic training of hospital food service personnel on food safety, hygiene and better cooking methods to address the unsatisfactory aspects of hospital food services (Fernando & Wijesinghe, 2017), which can easily be monitored through audits and patient complaints. These efforts will not only help available resources to be used more efficiently but will also have a positive cost–benefit outcome in the long run. It is in every organisation's interests to train its employees according to the need of the current times so that they can compete with their competitors (Khan et al., 2011) and contribute to the achievement of the objectives of the organisation.

Engetou (2017) asserts that training eliminates risks, since trained employees have the potential to make better economic use of resources, thereby reducing waste and damage to equipment. She further argues that, in line with other studies on this topic, training employees leads to greater efficiency and improved productivity, and increases loyalty and staff morale.

2.12.2.1 Factors affecting employee training

There are various factors affecting service quality in the workplace. These factors range from staff morale and attitudes, the nature of the working environment and the calibre of managers and supervisors, to the content of and methods used in training.

2.12.2.2 Training relevance

It is important to ensure that a thorough analysis is conducted by the immediate supervisor into employees' training needs and preferences, which should be aligned to the development needs

of the employees and organisational objectives. Furthermore, the training should deal with the core content of a specific job and should be geared towards enhancing employee performance and organisational productivity (Engetou, 2017). This is important because most training programmes tend to be generic and not sufficiently tailored to specific roles and skills. Generic training programmes can strain employees' time and patience as well as companies' resources because they force employees to engage with content that is not relevant to their core job responsibilities.

2.12.2.3 Organisational factors

The organisational environment has a major influence on employees' morale, performance and quality of services rendered. Birdi (2005) argues that a conducive training environment positively impacts the effectiveness of training; thus training should not be generic if the intention is to achieve truly successful training outcomes. For example, the training venue and materials to be used should be prioritised and planned in ways that meet the needs of the employees in question.

2.12.2.4 Availability of funds

A restriction on the budget allocated for employee training and development can negatively impact the scope of the training to be provided, including the venue, the programme content, the facilitator and the intended outcomes (Kennedy et al., 2014). Training budgets tend to be inadequate to meet ongoing training requirements. Yet while training is usually costly, it is necessary and tends to save an organisation a lot of money down the line.

2.12.2.5 Individual factors

Individual attitudes and morale have a significant impact on training delivery and outcomes (Licombe, 2018). If employees scheduled to attend a training programme have a negative attitude towards the training for their own personal reasons, their participation in the training may be restricted and the objectives and outcomes of the training may not be achieved. To ensure their active participation, employees need to be open-minded and educated about the need for and purpose of the training (Engetou, 2017). It is the duty of the manager to identify employees' areas of weakness and bolster these through training, while also providing encouragement and motivation (Chiaburu, Van Dam & Hutchins, 2010).

2.12.3 Procurement and service delivery

In 2003, the South African government introduced the supply chain system in order to institute best supply chain practices in the public sector. Currently, supply chain management (SCM) and procurement are of particular significance in the public health sector given that they were used as policy tools for discriminatory and unfair practices during the apartheid era (Bolton, 2006). Public procurement is a system whereby public sector organisations acquire goods and services from, and engage in projects with, suppliers in the local and international markets, subject to general principles and standards. Musanzikwa (2013) asserts that the overall aim of procurement is to ensure that all goods and services procured are of the right quality, from a reputable source and of a reasonable and market-related cost, and can be delivered in the right quantities, to the right place and at the expected time of delivery.

Public procurement can have a significant influence on the overall success of an organisation, depending on the control processes and management systems in place. If implemented successfully, the six standard procurement objectives identified below can serve as a tool to guide and ensure effective procurement in public entities. The specific objectives are: (i) to procure quality materials, items and economical services from reliable sources; (ii) to ensure the timely delivery of goods and services through the selection of efficient and capable organisations; (iii) to continually locate, monitor, evaluate and develop economically reliable sources of supply; (iv) to identify the most reliable sources of supply through an open tender, multi-stage tendering or limited tendering process; (v) to investigate the availability of new materials and monitor trends in the market prices; and (vi) to procure goods and services in accordance with an organisation's policies (Bolton, 2006).

Despite the employment of SCM as a strategic tool, public procurement in South Africa still faces enormous obstacles. These obstacles include: (i) a lack of proper knowledge, skills and capacity; (ii) non-compliance with SCM policies and regulations; (iii) inadequate planning and budgets not linked to demand; (iv) a lack of accountability, and the prevalence of fraud and corruption; (v) inadequate monitoring and evaluation of SCM; (vi) unethical behaviour; (vii) too much decentralisation of the procurement system; and (viii) the ineffectiveness of the black economic empowerment (BEE) policy (Bolton, 2006).

2.13. Procurement challenges facing public hospital food services

There are a number of procurement-related challenges faced by hospital food services in hospitals in the Eastern Cape. Possible challenges that could hinder the quality and efficiency

of service delivery by hospital food services include: (i) ineffective contract management processes; (ii) inadequate quality of resources and services rendered by suppliers; (iii) suppliers' financial challenges; and (iv) a lack of information among end users (food service managers) such as transparency in the process of bid advertising and awarding of tenders, quantities left on the contract as well as the appropriate steps to take when a supplier is non-performing, failing to deliver goods ordered or when a supplier is delivering sub-standard quality.

Additionally, contract registers that indicate the duration of the contract with specific start and end date, contract type and contract value of a particular food contract to prevent irregular expenditure that may be due to exceeding quantity of goods on contract or having two active contracts of the same item and strengthening contract management as well as the efficiency of hospital food services. According to the National Treasury (2010) good practice contract management in public institutions has the capacity to increase revenue, decrease costs and improve service delivery.

2.14 Challenges facing hospital food services in other countries

Despite efforts made over the years to improve hospital food services globally, public hospital food services are still faced with challenges relating to food quality. In Brazil, a study conducted by Bertin et al., (2009) revealed that a number of challenges prevented food handlers from realising their aim of preparing safe, quality and nutritious meals. According to the food handlers, these challenges could be summarised as follows: (i) upper management not prioritising human and material resources for food services when making resource-allocation decisions; (ii) a perception that upper management considered food handlers' jobs to be of lesser importance; (iii) the lack of periodic training; (iv) the lack of administrative skills among managers; (v) the lack of food, kitchen utensils and equipment; (vi) delayed overtime payments; and (vii) unhealthy working conditions (Bertin et al., 2009).

Conclusion

The nutritional and mental health status of hospitalised patients is affected by various factors during hospitalisation. The paucity of malnutrition data on hospitalised patients (and especially psychiatric patients) in South African health settings has reached a crisis level – particularly considering the impact of malnutrition on patients' health and wellbeing and on the economy as a whole. While there is no credible data available on the nutritional status of in-patients in

public psychiatric hospitals, one of the clear contributing factors to the declining nutritional status of hospitalised patients is sub-standard food quality. In this regard, a review of the empirical literature has revealed that public procurement is a salient factor in the quality of public food services.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter describes the research methodology employed to achieve the aim and objectives of the study, which were to assess the nutritional adequacy and quality of food provided to hospitalised psychiatric patients and to investigate those factors affecting food provisioning in public psychiatric hospitals in the Eastern Cape. The chapter describes the research design, the study setting and the study population, followed by the sampling and data-collection techniques and analysis. It furthermore provides details on validity and reliability and concludes by discussing ethical considerations regarding the study. A research proposal (Appendix 1) was submitted to the Biomedical Science Research Ethics Committee of the University of the Western Cape for approval and ethical consideration.

3.2 Research design

A descriptive, cross-sectional research design was used. A cross-sectional study is an observational study that analyses data from a population or a representative subset at a specific point in time. Given the time constraints under which the study was conducted, it was impossible to consider and research all entities making up the population. Therefore, a small part of the population was selected to project the reality of the whole population. This type of research design is cost-effective, and less time is needed to conduct the research (Sertia, 2016). In terms of this design, the primary component of the study was supported by an audit of the food service unit and the knowledge, attitudes and perceptions of the staff (secondary data set). Qualitative components, such as document reviews, interviews and the food service audit, can have important quantifiable outcomes.

3.3 Study setting

The study was conducted in four public psychiatric hospitals in the Eastern Cape. The Eastern Cape province has a population of 6 522 700 people across six districts (divided into 31 local municipalities) and two metropolitan municipalities, namely Buffalo City and Nelson Mandela Bay. The four psychiatric hospitals in the Eastern Cape have a combined capacity of 1284 beds, with Komani Mental Health Hospital being the largest with a capacity of 440 beds. Two other psychiatric hospitals in the province accommodate nearly the same number of patients, with

Tower Hospital and Rehabilitation Centre having 400 beds and Fort England Hospital having 314 beds. In contrast, Elizabeth Donkin Hospital is the smallest of the four psychiatric hospitals with 130 beds. Across the four hospitals, most psychiatric patients (estimated at 92.7%) are Xhosa speaking (Eastern Cape Socio Economic Consultative Council, 2017).

Figure 3.1: Locations of the four psychiatric hospitals in the Eastern Cape province, South Africa (Google Maps, 2018)

3.4 Study population

The study included all four public psychiatric hospitals in the Eastern Cape (Figure 3.1). In a study population, it is impossible to consider and reach all entities that comprise it, and therefore a small part of the population was selected to represent the whole population (Zimba, 2014).

The target population was public psychiatric hospitals in the Eastern Cape. The study population comprised all those who were on a normal diet with no additional nutritional requirements in these hospitals who were the target population for the plate-waste audit. All food handlers (food service aids, nurses, food service managers and support services) in the public psychiatric hospitals in the Eastern Cape were the target population. The selected target population for the study was based on the commonalities of the chosen four psychiatric hospitals, which included:

- They were all government-funded hospitals; provided psychiatric care, treatment and rehabilitation; and provided a food service to psychiatric in-patients.
- The targeted participants and key informants directly or indirectly contributed to food provision either through food procurement or directly through nutritional care (food preparation and cooking or direct feeding of patients).
- Across the hospitals, hospital food service units were in-house, had the same food service system and were managed by a food service manager and a team comprising food service handlers and food service supervisors.
- The four hospitals used a standard 8-day cycle menu throughout the year without any seasonal changes.
- The cooking of meals, including snacks, was done in the food service units and then transported to the wards with the use of trolleys and vehicles in some hospitals, depending on the facility structure.

3.5 Data collection and analysis

Data-collection tools were adapted for the South African context to ensure validity and reliability of the data.

3.5.1 Plate-waste audit

A plate-waste audit is one method used to assess the nutritional adequacy of meals served in a hospital. The plate-waste audit determined the amount of food that remained uneaten on patients' plates after a meal. A bulk waste study was conducted, which included weighing and recording all food delivered to two wards and dished to patients over three consecutive days in the five-day data-collection period per hospital. The mealtimes assessed were breakfast, lunch and supper, as well as snacks provided in between the main meals. These meals were compared with the requirements set for food ration scales in hospitals and health institutions in South Africa.

Food issued to each ward was weighed before dishing and at least five plates were weighed after dishing and data recorded. Once patients had finished eating and plates had been collected from the dining areas, excess food left uneaten on the plates was separated into clear bags coded per food group and ward, and later weighed to determine the quantities of waste after each mealtime. The food consumed was analysed using Food Finder software version 3 and an

average nutrient intake per person was calculated in accordance with the Recommended Dietary Allowance (RDA) guidelines.

3.5.2 Questionnaires

The researcher used questionnaires as one of the methods of collecting data. The questionnaire is the basic tool used in survey-based research (Panacek, 2008). A questionnaire may be described as a document that collects information in an organised way, including the indicators of the variables linked to the objective of the survey. Questionnaire 1 (Appendix 2A) [Food handler knowledge of and attitudes towards patient food quality] and Questionnaire 2 (Appendix 2B) [Nurses' perceptions of the nutritional needs of psychiatric patients] were used to elicit more in-depth information from the participants and informants in order to answer the main research question in the study. The questionnaires were distributed on the second day in each hospital to give participants sufficient time to complete them. The questionnaires were formulated by the researcher in line with the study's research questions.

The perceptions of healthcare workers with regard to the nutritional needs of mental health patients were determined by the researcher. Structured questionnaires were used to elicit relevant information. This was because structured questionnaires are regarded as a reliable method of research and can be used to reach a large number of people in a short period of time (Anguita et al., 2003).

3.5.3 Open-ended interviews

Key informants were interviewed on the first day. They included food service managers, ward-based food handlers, the chief executive officer (hospital manager), operations managers from the nursing component and two supply chain officers (i.e. assistant director/ deputy director and a buyer in each hospital). Thereafter, food service managers were interviewed when necessary, and interviews were digitally recorded to allow the interviewer to concentrate on the interview at hand. The interviews were semi-structured. Semi-structured interviews have the potential to provide reliable and comparable, qualitative data (Blandford, 2013).

The primary benefit of digitally recording interviews is to allow the researcher to concentrate attentively on the participants' responses rather than to write notes, which can both distract the researcher (interviewer) and disrupt the interview (DiCicco-Bloom & Crabtree, 2006). Moreover, digitally recorded interviews allow the interviewer and the interviewee the opportunity to foster a better relationship and rapport, prompting the latter to disclose more in-

depth information (DiCicco-Bloom & Crabtree, 2006). The information obtained from the interviews was then used in the synthesis of information gathered from the document review and food service audit.

3.5.4 Observations

According to Kawulich (2005), participant observation is the process of learning through exposure to or involvement in the day-to-day activities of participants in the researcher's setting. The researcher conducted a general audit in the hospital food service unit, ward kitchens and main storage facilities using a standard checklist to observe food service systems and the availability of storage areas and equipment (Appendix 2C). A limitation of the observation approach is that people tend to alter their behaviour when they know they are being watched (Kawulich, 2005). In addition, the method itself is subject to bias if it is not validated by another data-collection method (Mohajan, 2017). In order to address bias, the researcher used other data-collection methods, such as key informant interviews and the plate-waste audit, to triangulate information.

3.5.5 Document review

In South Africa, supply chain management through procurement is central to the government's service-delivery system (Bolton, 2006). Public procurement is defined here as the function of acquiring goods and services from, and engaging in projects with, suppliers, subject to general principles and standards being upheld (Bolton, 2006). The five supply chain principles, in no particular order, are: (1) value for money; (2) transparency; (3) ethics and fair dealing; (4) accountability; and (5) competitiveness and (6) equitability. A number of supply chain and procurement documents were reviewed and findings recorded. These documents included food specifications for perishable foods, supplier compliance and contract management documents, and bid allocation documents specifically relating to food provision. In addition, the researcher reviewed food service documents, such as financial records, to estimate cost trends per meal and per patient compared with the budget allocation for the current financial year.

3.6 Sampling technique and sample size

In non-probability sampling, not every group in the population gets an equal chance of participating in the investigation (Alvi, 2016). Purposive sampling entails the identification and selection of information-rich research participants for the most effective use of resources (Palinkas et al., 2015) and the identification of individuals knowledgeable or experienced in an

area of interest, thus allowing for detailed and accurate data collection (Creswell et al., 2011). To provide additional, auxiliary information and to increase the effectiveness and efficiency of the data collected, demographic information was obtained using questionnaires. Purposive sampling requires less time to complete and is economical. For the purpose of this study, the researcher randomly selected two wards per hospital to conduct the plate-waste study.

The plate-waste study was conducted at every meal over three consecutive days. In each hospital the two wards randomly selected consisted of one male ward and one female ward. This provided the researcher with a good representation of the standardised eight days' cycle menu used in all four hospitals. In the selected hospitals, a sample of at least 60 nurses who had been allocated to work in the wards were approached randomly until a quota of 51 (collected completed questionnaires) was achieved for the purpose of assessing staff knowledge and perceptions regarding the nutritional needs of psychiatric patients. All food handlers on duty at the time of data collection were included to assess their knowledge, attitude and practices relating to food preparation and dishing at ward level. Hospital staff who formed part of the support services that play a significant role in patient food provisioning (such as supply chain and procurement officers, human resources officers, finance officers, food service managers and nursing operational managers) were interviewed in order to obtain information that would help to answer the research questions in the study.

3.7 Data analysis

The data collected from the questionnaires was coded and grouped during the data-collection process (Theron, 2015) and analysed using the Statistical Package for the Social Sciences (SPSS) software version 25. Descriptive and inferential statistical analysis was conducted, and the findings were presented in the form of a discussion, graphs, figures and visuals to represent themes. The nutrient composition of food provisioning was determined using the Food Finder software version 3 (South African Medical Research Council, 2019). The data analysis primarily followed a quantitative approach, with the analysis of perceptions done in SPSS.

Symonds and Gorard (2008) assert that all methods of data collection have limitations and therefore the use of multiple methods can neutralise or cancel out some of the disadvantages of certain data-collection methods. Hence, using a questionnaire and observations strengthened the validity and reliability of this study. Chi-square testing was used to assess statistical significance differences between hospitals, with the cut-off point for statistical significance set at $p<0.05$.

3.8 Validity

In a qualitative study, rigour is important as it helps to ensure that the study is credible and provides an accurate reflection of what the participants said. In terms of the data-collection instruments used, the researcher ensured content validity by adapting some questions from similar published work to the local context. During data collection, triangulation and member checking were prioritised by the researcher to ensure rigour in the study. To enhance the credibility and validity of the study, the researcher obtained a face validity review from an expert (a dietician) with extensive healthcare and food service experience. Moreover, the questionnaires were further validated by conducting a pilot test at a psychiatric hospital in the Western Cape prior to data collection. The use of computer programs such as Food Finder version 3 to quantitate plate waste and the SPSS version 25 enhanced the systematic analysis of the data.

3.9 Confidentiality and risk of the study

The researcher ensured that participants' privacy and anonymity were respected by using hospital identifier codes rather than the participants' names on all the documents, including the consent form. The identifier code that was captured on the informed consent form was captured in all the documentation for each individual and was used for all analytical purposes. The participants were assured that all data collected, including hard copies such as consent forms, the observation checklist, interview notes and questionnaires, would be kept in a lockable cabinet and converted to soft copies which would be password-protected. Only the researcher and the principal investigator had access to the information and no third-party access was permitted to the recordings. Should the executive manager of a hospital request a report on a specific hospital, a comprehensive report with anonymised information for the hospital would be provided and a separate report sent to the hospital's chief operating officer.

3.10 Ethics

The research proposal was submitted to the University of the Western Cape's Biomedical Research Ethics Committee [BMREC] (Appendix 3A), the National Health Research Database and the Eastern Cape Department of Health (Appendix 3B). The participants were provided with an information sheet (Appendix 3C) that explained the purpose of the study. The consent form (in which participants agreed to partake in the study) was discussed with participants prior to the commencement of the data-collection process (Appendix 3D). In the consent form, the participants were reassured that they would not be intimidated or unjustly treated should they

refuse to participate in the study. Moreover, emphasis was placed on the fact that participation was voluntary and participants could withdraw from participating in the study at any stage if they wished to do so, with no penalties.

Data-collection forms and participant information sheets were translated into IsiXhosa to ensure that all participants clearly understood the intentions of the study. The interviews were conducted in the participant's language of choice to enable them to express themselves better than they would have done when responding in a second language. In this regard the researcher is conversant in both English and IsiXhosa. Moreover, letters and all supporting documents relevant to the study were sent to the hospitals' chief executive officers requesting permission to conduct research in their respective hospitals. Findings would be disseminated to the research community and the Eastern Cape Department of Health as well as those hospitals that requested a report following the completion of the study. After the completion of the data-collection process, preliminary feedback (Appendix 3E) was given to three of the four hospitals in a PowerPoint presentation and a soft copy of the presentation was given to the chief executive officer in Hospital C and to the quality assurance officers in Hospitals A and C.

3.11 Limitations of the study

There is a paucity of published literature on the nutritional adequacy and quality of food provided to adult in-patients in public hospitals both in the Eastern Cape and in the greater part of South Africa as a whole. This made it difficult to access documents and local literature pertinent to the research topic. The sample size was small and was used to generalise the nutritional adequacy and quality of food to a larger population. Therefore, the research cannot be deemed to represent all public hospitals in South Africa.

Another possible limitation of the study was the limited time that the researcher had to access the various hospitals' food suppliers without affecting their daily operations. Future longitudinal studies in other psychiatric hospitals in other provinces are warranted so as to arrive at a more informed understanding of the research problem.

Conclusion

- This chapter reflected on the procedures and methods that were employed to answer the research questions of the study and also to achieve the main purpose of the study. The main research question of the study was to determine the nutritional adequacy and quality of food provided in the four psychiatric hospitals. In addition, the study

identified factors that affected food provisioning. Additionally, the intention was also to determine the KAPs of food handlers in terms of food handling and food quality. To answer the research questions of the study, a plate waste study was conducted in a four psychiatric hospitals and finding were analysed using Food finder version 3, while questionnaires were used to assess knowledge, practices and attitudes of food handlers as well as the perceptions of nurses on the nutritional needs of psychiatric patients. Data collection tools such as observations over the five days in each hospital provided crucial information that answered the research questions of the study.

CHAPTER 4

RESULTS

4.1 Introduction

This chapter presents the findings from the study. Most of the data was generated quantitatively but the information gleaned from the various responses was organised and interpreted qualitatively.

This study aimed to assess the nutritional adequacy and quality of food provided to psychiatric patients in public psychiatric hospitals in the Eastern Cape. A bulk plate-waste study was conducted in one adult-male and one adult-female ward in each participating psychiatric hospital over three consecutive days. Inclusion criteria included male and female wards from the hospitals where most patients were on a normal diet and did not experience eating difficulties. Plate-waste results were analysed, using Food Finder software version 3 (South African Medical Research Council, 2019), to determine patient food intake. Interviews aimed to examine the experiences of and challenges faced by food service managers in performing effective food service functions in food service units. Three senior food service managers, one acting food service manager, two food service supervisors, three operational managers, four quality assurance officers and four supply chain officers were interviwed.

Furthermore, in an effort to examine the factors that affect food quality in public psychiatric food service units, observations were conducted over five days in each of the hospitals to assess the practices of food handlers. Specific attention was given to the extent to which food handlers complied with food safety and quality standards and to the factors affecting food quality. Two surveys were conducted. The first survey determined the food handlers' knowledge of and attitudes towards food quality (Appendix 2A). The second survey assessed the perceptions of nurses regarding the nutritional needs of psychiatric patients (Appendix 2B). A total of 28 food handlers and 54 nurses participated in the two surveys**.** Fifteen key informants were interviewed.

4.2 Characteristics of hospitals and participants

The four psychiatric hospitals that participated in this study were identified using alphabetic codes. The total capacity of the four psychiatric hospitals was 1294 beds. Food services in each

of these hospitals were managed by a food service manager, except for the smaller hospital (140 beds) which was managed by an acting food service manager (Table 4.1).

Table 4.1: Description of sample hospitals

Coding identifier	Bed capacity	Managed by	Number of dedicated food handlers
Hospital A	400	Food service manager	16
Hospital B	440	Food service manager	14
Hospital C	314	Food service manager	15
Hospital D	140	Acting food service manager	17

The socio-demographic characteristics of food handlers who participated in the survey are shown in Table 4.2. The literacy and education levels of food handlers who worked in the hospital food service unit can be described as literate, as 57.7% of these individuals had matric certificates. This qualified them to be able to read and understand the basic regulations of food services or read a recipe with sufficient understanding to prepare a dish.

Table 4.2: Socio-demographic characteristics of food handlers

Variable	Categories	Number (n)	Proportion (%)
Sex	Male	10	35.71
	Female	18	64.29
Age	18–35	7	25.0
	36–45	11	39.3
	46–55	6	21.4
	56 and above	4	14.3
Education	No schooling	1	3.6
	ABET/Secondary	9	32.1
	Matric	16	57.7
	Diploma/Certificate	2	7.1

The socio-demographic characteristics of the fifty-four-nursing staff who participated in the survey (mostly from wards where plate-waste studies were done) are shown in Table 4.3. The majority (87%) of the nurses that participated in the study were females.

Table 4.3: Socio-demographic characteristics of nurses

Variable	Categories	Number (n)	Proportion (%)
Sex	Female	47	87
	Male	7	13
Age	18-35	22	40.74
	36-45	21	38.89
	46-55	7	12.96
	56 and above	4	7.41
Education	Matric	9	16.67
	Diploma/Certificate	29	53.70
	Bachelor's degree	7	12.96
	Post graduate degree	9	16.67

Information obtained from the nursing staff on the height, weight and age of patients in the wards where plate waste was studied were accessed through document reviews by nurses in the wards. The purpose of this information was to establish the target patients' profile to use as a reference for estimating patients' nutrient requirements (Table 4.4). Most patients (75%) in the four psychiatric hospitals were of African descent for both males and females with male patients dominating (80% of all patients). The targeted patients in the study were found to be between the ages of 18 and 55 years. Across the four hospitals, the majority of patients were on a normal/full diet with a minority of patients on therapeutic diets such as diabetic, low salt, high protein and low fat. The majority of the patients are smokers and high rates of smoking were observed in the four hospitals, particularly among male patients in comparison to female patients.

Table 4.4: Characteristics for estimating patient nutrient requirements

Patient profile		
Gender	Male (n = 910)	Female (n = 210)
Mean age (years)	33	42
Mean height (cm)	158	163
Mean weight (kg)	79	78
BMI (kg/m^2)	31.6 (obese)	29.4 (overweight)
Activity level	Low	Low

4.3 Nutritional adequacy of food provision

Five sample plates were used as index plates and were weighed on an electronic scale at each meal in each of the selected hospital wards over three consecutive days. Starch, protein and vegetables were weighed as five sample portions before the plates were given to the patients.

Mealtimes targeted were breakfast, lunch and supper. Snacks were also noted, as reported by the hospital food services, the nurses and general assistants who received the food in the wards.

Once the patients had finished eating, the food was separated from all returned plates according to the various food groups. The average weight of a food group wasted was determined by weighing the waste. The average nutrients provided to patients were estimated based on the average portion of each menu item consumed [portion – waste = consumption]. The average nutrient intake of patients was determined using Food Finder version 3. Patients' energy requirements were calculated using both the Harris-Benedict Equation and Mifflin St Jeor Equation (Amirkalali et al., 2008).

Average male and female patient profiles were estimated (Table 4.4). The estimated average female patient was 42 years old, weighed 78 kg and had a height of 163 cm. The study estimated that the average male patient was 33 years old, weighed 79 kg and had a height of 158 cm. The estimated vitamin and mineral requirements for all patients were calculated using the RDA (Table 4.5). To enhance the credibility and accuracy of the estimated total energy requirements, an average of the Harris-Benedict Equation and Mifflin St Jeor Equation was used (Table 4.6).

Table 4.5: Estimated average vitamin and mineral requirements of patients

Nutrients	DRI / RDA		UL
	Male	Female	
Vitamin A (µg)	900	700	3000
Vitamin B1 (mg)	1.2	1.1	-
Vitamin B2 (mg)	1.3	1.1	-
Vitamin B3 (mg)	16	14	35
Vitamin B5 (mg)	5	5	-
Vitamin B6 (mg)	1.3	1.3	100
Vitamin B7 (µg)	30	30	-
Vitamin B9 (µg)	400	400	1000
Vitamin B12 (µg)	2.4	2.4	-
Vitamin C (mg)	90	75	2000
Iron (mg)	8	18	45
Zinc (mg)	11	8	40
Calcium (mg)	1000	1000	2500
Magnesium (mg)	420	320	350

Source: Dietary Reference Intakes (Otten et al., 2006)

Table 4.6: Estimated average energy requirements for male and female patients

	Women	Men
Weight	78 kg	79 kg
Age	42 years	33 years
Height	163 cm	158 cm
BMI	29.4kg/m^2	31.6m^2
Energy	**Harris-Benedict Equation:** BEE (♀) = 655.1 + 9.6 (Wt [kg]) + 1.9 (Ht [cm]) – 4.7 (Age [y]) = 655.1 + 9.6 (78 kg) + 1.9 (163 cm) – 4.7 (42 y) = 1519 kcal TEE = BEE x activity factor (1.3) = 1519 kcal x 1.3 = 1975 kcal ≈ **8294 kJ**	**Harris-Benedict Equation:** BEE (♂) = 66.5 + 13.8 (Wt [kg]) + 5.0 (Ht [cm]) – 6.8 (Age [y]) = 66.5 + 13.8 (79 kg) + 5.0 (158 cm) – 6.8 (33 (y) = 1719 kcal TEE = BEE x activity factor (1.3) = 1719 kcal x 1.3 = 2235 kcal ≈ **9387 kJ**
	Mifflin St Jeor: BMR (♀) = (10 x Wt [kg]) + (6.25 x Ht [cm]) – (5 x age[y]) - 161 = (10 x 78 kg) + (6.25 x 163 cm) – (5 x 42) - 161 = 1431 kcal BMR + PA = BMR x activity factor (1.2) = 1431 kcal x 1.2 = 1717 kcal ≈ **7213 kJ**	**Mifflin St Jeor:** BMR (♂) = (10 x Wt [kg]) + (6.25 x Ht [cm]) – (5 x age[y]) + 5 = (10 x 79 kg) + (6.25 x 158 cm) – (5 x 33) + 5 = 1615 kcal BMR + PA = BMR x activity factor (1.2) = 1615 x 1.2 = 1938 kcal ≈ **8138 kJ**
	Ave energy (♀) = (HB + MSJ)/2 = (8294 kJ + 7213 kJ)/2 = **7754 kJ**	**Ave energy (♂)** = (HB + MSJ)/2 = (9387 kJ + 8138 kJ)/2 = **8763 kJ**
	Ave energy (♀ + ♂) = (Ave energy (♀) + Ave energy (♂))/2 = (7754 kJ + 8763 kJ)/2 = **8258 kJ**	

4.3.1 Estimated macronutrient, micronutrient and vitamin requirements for patients

Requirements for patients in all four psychiatric hospitals for macronutrients and micronutrients were estimated using dietary reference intakes (DRIs) (Otten et al., 2006) (Tables 4.6 and 4.7).

Table 4.7: Estimated average macronutrient requirements for patients

Nutrients	DRI / RDA		UL
	Male	Female	
Energy (kJ)	8763	7754	
Carbohydrates (g) (55%)	284	251	
Protein (g) (15%)	77	68	74–260
Fat (g) (30%)	69	62	66–116

4.3.2 Total energy provided

One of the four hospitals provided total energy that was lower than the RDA. Hospitals B, C and D provided total energy that was within the RDA for the profiled patients (Table 4.8).

Table 4.8 Average total energy provision to females and males in all four hospitals

Variable	Hospital A	Hospital B	Hospital C	Hospital D	RDA
Females	7395 kJ	7693 kJ	7679 kJ	7690 kJ	7614 kJ
Males	7434 kJ	8544 kJ	8641 kJ	8281 kJ	8763 kJ

4.3.3 Macronutrients provided

Three of the hospitals provided carbohydrates that were adequate to meet the nutrient needs of both female and male patients, while one hospital provided carbohydrates that were lower than the RDA (Table 4.9).

Table 4.9: Average carbohydrate provision to females and males in all four hospitals

Carbohydrates	Hospital A	Hospital B	Hospital C	Hospital D	RDA
Females	211 g	284 g	255 g	258 g	251 g
Males	256 g	298 g	289 g	292 g	284 g

Protein was adequately provided in three of the four hospitals, while only one hospital provided protein below the recommended daily requirement of 68g and 77g (female/male) (Table 4.10).

Table 4.10: Average protein provision to females and males in all four hospitals

Variable	Hospital A	Hospital B	Hospital C	Hospital D	RDA
Females	58.65 g	100.20 g	110.95 g	120.91 g	68 g
Males	58.65 g	100.23 g	110.95 g	120.91 g	77 g

Table 4.11: Average fat provision to females and males in all four hospitals

Variable	Hospital A	Hospital B	Hospital C	Hospital D	RDA
Females	49.21 g	94.28 g	92.30 g	102.91 g	62 g
Males	49.56 g	94.51 g	92.00 g	102.81 g	69 g

The provision of fat to females and males in three hospitals was significantly higher than the recommended quantity (Table 4.11), while Hospital A provided less fat than the RDA. Fat provided in hospital A was margarine containing 40% fat spread and little vegetable oil was used during the cooking of main meals. The provision of fibre to males, in particular, was low in all four hospitals (Table 4.12).

Table 4.12: Average fibre provision to females and males in all four hospitals

Variable	Hospital A	Hospital B	Hospital C	Hospital D	RDA
Females	10.2 g	15.2 g	20.3 g	21.5 g	25 g
Males	10.3 g	15.5 g	20.5 g	21.5 g	38 g

Mineral provision was significantly low in all four hospitals, with calcium least provided in Hospital A, while iron provision was below the RDA to meet patient nutrient needs. The provision of iron to male patients was adequate in two of the four hospitals, while the other two hospitals provided iron that was lower than the RDA. The provision of other minerals, particularly calcium, was significantly low in all four hospitals (Table 4.13). The provision of mineral to males in all four hospitals was generally lower than the RDA, with iron provided adequately in hospital C and D, with calcium significantly low in all four hospitals (Table 4.13).

Table 4.13: Average mineral provision to males in all four hospitals

Minerals	Hospital A	Hospital B	Hospital C	Hospital D	RDA
Iron (mg)	6.52	6.89	9.97	11.23	8
Zinc (mg)	2.69	2.95	3.12	4.22	11
Calcium (mg)	210.6	451.7	361.9	243.1	1000
Magnesium(mg)	151.9	299.2	311.3	317.8	420

Table 4.14: Average mineral provision to females in all four hospitals

Minerals	Hospital A	Hospital B	Hospital C	Hospital D	RDA
Iron (mg)	4.85	6.89	9.97	11.23	18
Zinc (mg)	1.82	2.95	3.12	4.22	8
Calcium (mg)	255.4	454.70	361.90	243.10	1000
Magnesium (mg)	225.13	299.20	311.30	317.80	320

In all four hospitals the provision of vitamins was lower than the RDA, with vitamins A and C, biotin and folate the least provided in Hospital A. Niacin was adequately provided in Hospital C and Hospital D with just above the recommended requirement (Table 4.15).

Table 4.15: Average vitamin provision to males and females in all four hospitals.

Vitamins	Hospital A	Hospital B	Hospital C	Hospital D	RDA
Vitamin A (mcg)	400	695	692	705	800
Vitamin B1 (Thiamin) (mg)	1	1	2	1	1.10
Vitamin B2 (Riboflavin) (mg)	1	1	1	1	1.30
Vitamin B3 (Niacin) (mg)	9	11	15	16	15
Vitamin B6 (mg)	1	1	1	2	1.60
Vitamin B9 (Folate) (mcg)	88	92	100	121	180
Vitamin B12 (mcg)	1.1	1.8	1.83	2	2
Vitamin B5 (Pantothenic acid) (mg)	1.1	2.1	2.84	1.95	2.84
Vitamin B7 (Biotin) (mcg)	20	21	25	22	65
Vitamin C (mg)	38	49	54	53	60

4.3.4 Food waste: A reflection of food intake

Food waste from male wards was significantly low in all four hospitals. Generally, significant amounts of food waste from female patient's wards was noted when compared to male patients wards across the four hospitals. Food waste from male patients' plates was mainly bones, butternut and pumpkin peels. A significant amount of undished food was observed in Hospital A on the three consecutive days during breakfast (Table 4.16).

Table 4.16: Example of food wasted in a female ward in Hospital A

Food item	Bulk portion dished	Served	Undished (wasted)
Mealie meal (kg)	15.60	8.20	7.40
Amabele (kg)	15.00	7.92	7.78
Stiff pap (kg)	16.05	11.21	4.48

In Hospital C, food waste was high during breakfast on two consecutive days of the plate-waste study. In Hospital B, undished food in the female wards was discarded, while extra food was offered to patients as seconds once dishing for all patients was done. Also, in Hospital B, food waste from dished plates was generally vegetables, such as fresh shredded cabbage and steamed carrots, in both male and female wards.

Table 4.17: Example of food wasted in a female ward in Hospital B

Food item	Food item	Bulk portion dished	After consumption	Undished (wasted)	Total food wasted
Breakfast	Oats (kg)	12.490	0.830	2.090	2.920
	Morvite (kg)	15.495	1.240	1.160	2.400

Furthermore, it was found that food waste was significant from patients' plates when certain foods were served, such as mashed potatoes in Hospital C (Table 4.18).

Participant C3, Hospital C, said: *Most of the patients are of the African race, they don't like food from the menu we provide, as they are not used to eating such food in their homes, for example, Matabela. "Asikwazi ukupheka umvubo ne stiff pap ngoba sisebenzisa iprovincial menu and azikho kuyo."*

"We are unable to serve sour milk and maize meal pap and stiff pap as we are guided by a provincial menu and the food items are not in the prescribed menu."

Table 4.18: Example of food wasted in a female ward in Hospital C

Mealtime	Food item	Bulk portion dished	After consumption	Undished (wasted)	Total waste
Lunch	Mashed potato (kg)	10.245 kg	1.385 kg	795 g	2.180 kg
	Coleslaw (kg)	3.925 kg	380 g	715 g	1.095 kg
	Mac and cheese (kg)	9.500 kg	0.535 kg	1.645 kg	2.18 kg

In Hospital D, no food waste was observed from the patients' plates after dining. However, a significant amount of food waste was observed as undished in the main kitchen where dishing took place, which may have been due to over-production (Table 4.19).

Table 4.19: Undished food in Hospital D

Food item	Undished
Chicken stew (kg)	8.985
Carrot and egg salad (kg)	3.735
Rice (kg)	3.440
Cottage pie (kg)	5.186
Butternut (kg)	2.325

4.3.5 Common patient food complaints

Participants (from both food services and the ward staff) reported that patients have a complaints platform where they raise concerns relating to food services and general care during their hospital stay. Patients have weekly meetings often known as climate meetings with nurses and quality assurance officers to discuss issues related to patient care as well as raising complaints, compliments and suggestions in order to improve patient care during hospital stay. Matters discussed in climate meeting include but was not limited to: food provisioning such as adherence to meal times and quality of meals provided by hospital food services. The quality assurance officers gather the complaints and share them with the respective heads of food services who do not sit in climate meetings. The key informants (quality assurance officers) revealed that common complaints from patients ranged from the quality and variety of food served to the late delivery of food from the kitchen to the wards.

One of the participants working in a food service unit reported that in cases where the main stores (i.e. storage areas managed by supply chain where dry goods or store items were kept) did not have stock of porridge ingredients, such as oats and amabele, their food service unit provided mealie meal porridge for a week. This participant maintained that when no variety of foods was provided, some patients complained directly by raising their concerns with food services.

Respondent ASS said: *"Patients often complain that we are giving them the same food items. It happens normally during breakfast."*

4.4 Description of meal provision

One of the objectives of the study was to determine and evaluate patient food intake over three consecutive days in each hospital. The study found that the portions of porridge served to the patients during breakfast were adequate. In three of the four hospitals, warm porridge was served with 40 g of sugar (either white or brown), tea with milk, two to four slices of brown

bread with spread and a protein (eggs, pilchards, chicken livers, polony or viennas). Hospital A was the only hospital that did not provide a protein dish during breakfast. In three of the four hospitals, bread was not buttered in the kitchen or by general assistants in the ward; patients were served a heaped teaspoon of margarine (approximately 25 g) to spread for themselves. Snacks were not served between breakfast and lunch in all four hospitals.

Lunch consisted of a protein, starch, two vegetables, one fruit and/or juice in three of the participating hospitals, while supper comprised a protein, starch and one vegetable incorporated into the protein dish or served as a side dish. In one of the four hospitals, fruit and juice were not served at all to patients with normal diets during the three days of the plate-waste study. A portion of fruit was served only to diabetic patients on the three days of the plate-waste study. Furthermore, the protein portions served over the three days across the four psychiatric hospitals were less than 120g, with the smallest portion being a single portion of a meatball weighing 45g.

Food was dished in the main food service unit and dished in bulk in three of the four hospitals. During dishing, food was not weighed on electronic scales to ensure adequate portions in line with the food ration scales of health establishments. It was also learnt that food handlers measured the food by approximating the different quantities using eye judgement. This contributed to inadequate portions and shortages of food for the last-dished plates in three of the four hospitals.

In Hospitals A and B, food was dished in large stainless-steel containers and transported to the various hospital wards in an open bakkie. In Hospitals A and B, no food warmers were used to maintain the food temperature above the food danger zone. In Hospital C, a similar vehicle to that used by Hospitals A and B was used, although a trailer with food warmers was used to deliver food to the wards. In all four hospitals, food was received by nursing staff or general assistants. In Hospital D, a plating system was used, with food being delivered to the various wards by the food handlers stationed in the wards using heavy-duty tea trolleys.

Movement from one ward to the other in Hospital C was easily facilitated as the wards were in the same building as the kitchen, except for one ward which was off the kitchen building. When food was delivered in Hospital D, food handlers stationed in the kitchen served the patients and waited until they had finished eating. Cutlery from all the mealtimes was washed by the food handlers. In this hospital, the food handlers returned to the food services unit to produce food for the next mealtime. In Hospitals A, B and C, food was dished by general assistants with the

help of nursing staff. In Hospital B, certain patients were responsible for setting the tables in the dining area, while other patients were responsible for dishing under the supervision of nursing staff (when available) or without supervision during the time that the study was conducted. In Hospital C, food was strictly dished by nursing staff and general assistants.

When participating food handlers were asked about ration scales for individual patients, they reported not knowing the exact quantities. Food was dished using various utensils, such as side plates, cups, dessert spoons, incorrect colour-coded spoons and solid spoons. In Hospitals A and B, cutlery and crockery were washed by patients, while in Hospital C, cutlery and crockery were washed by general assistants.

As a result of not weighing food in the food service unit in three of the four hospitals that did bulk dishing, food was at times seen to be short (particularly vegetables) when gauged against the number of patients in the ward. In addition, food was short due to the inappropriate use of dishing utensils in the wards. Items from certain food groups that were insufficient on the plates included: (i) vegetables, (ii) protein, and (iii) milk.

Examples of food portions served in three of the four hospitals that used a bulk serving system are shown in Tables 4.20, 4.21 and 4.22 below:

Table 4.20: Hospital A food portions in a male ward

Mealtime	Food item	Plate 1	Plate 2	Plate 3	Plate 4	Plate 5
Breakfast	Maize meal porridge	510 g	460 g	455 g	505 g	470 g
Lunch	Macaroni	225 g	200 g	205 g	180 g	195 g
Supper	Meal balls	110 g	95 g	65 g	55 g	60 g

There were inconsistent meal portions served in a male ward in Hospital A. The last plate received one portion of meatballs as they were short when they arrived from the food service unit. The patients had to be served half portions of the protein dish as the food service unit was already closed and could not provide extra food for the patients who were short of meat balls.

Table 4.21: Hospital B food portions in a male ward

Mealtime	Food item	Plate 1	Plate 2	Plate 3	Plate 4	Plate 5
Breakfast	Oats	515 g	530 g	525 g	775 g	860 g
Lunch	Mac and cheese	430 g	410 g	475 g	675 g	465 g
Supper	Umvubo	505 g	440 g	465 g	515 g	535 g

A significant amount of oats was observed on plates 4 and 5 in Hospital B. The oats provided on Day 2 of the plate-waste study were more than enough for the number of patients in the ward and leftover oats were dished onto the last few plates before food was served to the patients.

Table 4.22: Hospital C food portions in a female ward

Mealtime	Food item	Plate 1	Plate 2	Plate 3	Plate 4	Plate 5
Breakfast	Maize meal porridge	665 g	565 g	570 g	570 g	595 g
Lunch	Sweet carrot	90 g	85 g	88 g	100 g	105 g
Supper	Meatballs	130 g	120 g	65 g	60 g	65 g

4.4.1 Implementation of the eight-day cycle provincial menu

During the three days of the plate-waste study in all four psychiatric hospitals, only two of the four hospitals adhered to the eight-day planned menus that were displayed in the food service units (Appendix 4A, 4B, 4C and 4D). Hospital A did not comply with the planned menu, even though food items that should have been served were available in their food stores. They alluded to suppliers not delivering food items on time. Hospital D did not use a planned menu or alternatively followed an in-house menu that had been drafted by the acting food service manager using recipes that were not standardised.

Participant D1, Hospital D, said: *"When I arrived here there was a provincial menu, but the problem was that the items on the provincial menu were not available, so I served what I had. Currently we are using an institutional menu."*

Respondent C1, Hospital C, said: *"I deviate from the menu when I don't have food items, but I do not deviate by introducing food items that are not on the menu but rather serve during Day 2 instead of Day 1 and inform the wards."*

Participant A8, Hospital A, added: "*We deviate all the time. It's rare that we stick to our menu. Suppliers do not deliver on time; they deliver at their own times saying government has not paid or they do not have money. We cook whatever we have in the fridge."*

In all four hospitals, similarities in menu food items were noted. Food items were served at three main mealtimes (breakfast, lunch and supper). Breakfast consisted of a warm cereal, brown bread, spread, tea or coffee with milk and sugar, and a protein in three of the four hospitals (Appendix 6A). Lunch consisted of a protein, starch (white rice, samp or maize meal pap) and two vegetables either served as side dishes or one served as a side dish and the other

incorporated into the protein dish (Appendix 6B). Supper was a protein dish, starch and one side vegetable incorporated into the protein dish or umvubo (maize meal pap and sour milk), one fruit or juice (Appendix 6C). Three of the four hospitals provided beverages (Appendix 6D).

In three of the four hospitals, the provision of additional sugar was significantly high during mealtimes, particularly breakfast and afternoon teas. Another contributing factor to the high sugar intake was the provision of non-fruit beverages in Hospitals B and D (Appendix 6D). During observation days in Hospitals A, B and C, sugar was not portioned per patient; it was issued in bulk and heaped with a dessertspoon to flavour tea or porridge. Approximately 40 g of sugar was added to a porridge bowl, while approximately 500 g of sugar was added in a tea jug where tea was brewed for all the patients, totalling 56.6 g at breakfast only for one patient, excluding additional sugar added during the cooking of vegetables such as carrots, butternut, pumpkin and gem squash (Appendix 6E).

4.4.2 Use of standardised recipes during food production

The participants were also asked about the significance of using recipes when producing patient meals in the hospital food service units and their importance for the quality of the end product. Twenty of the participants (74.1%) reported that they believed it was important to use a recipe during food production. However, the study demonstrated that recipes were not being used in the food service units by the cooks, nor were recipes being used for accurate issuing of daily groceries for daily production by food service supervisors. However, recipe files were available in the food service manager's office in all four hospitals. Two supervisors from one of the hospitals maintained that they did not have recipes, nor had they seen them. One of the food service supervisors strongly affirmed that new recruits were trained by existing employees when they took up their duties, as there were no guideline books to train the new recruits on the use of supplied recipes.

Participant A2, Hospital A, said: *"There are no recipes at all. I have never seen them for 1 year 2 months, I do not want to lie."*

4.4.3 Implementation of a national food service policy

The study found that there is no standard provincial food service policy that is used as a guide to create uniformity in operations that best suit the interests of the Eastern Cape when documentary reviews of food service units are conducted. At the time of the study, the policy

in place was the Policy for Food Service Management in Public Health Establishments (DoH, 2010), which was a document that was not fully adhered to. Areas in which non-compliance was observed included the following: (i) adherence to recommended mealtimes; (ii) the provision of snacks, including an early-morning snack (05h00), a mid-morning snack (10h00), an afternoon snack (15h00) and an evening snack (22h00); (iii) provision of fruit and fruit juice; (iii) the segregation of working stations; (iv) adherence to production schedules; (v) adherence to food ration scales; and (vi) the issuing of food service uniform to food handlers.

4.4.4 Standard operating procedures

Although hospital food services fall under the wing of the provincial Department of Health, there are no signed, standard provincial operating procedures (SOPs) that describe the processes, procedures and responsible personnel in each of the four psychiatric hospitals. However, two of the four hospitals reviewed and signed SOPs during the course of the study.

Mealtimes differed from one hospital to another, as did the quantities of food and food items served. For example, in Hospital A, each patient received four slices of bread per day or six slices when there was extra bread; in Hospital B, each patient received 11 slices of brown bread per day; in Hospital C, each patient received six slices of bread per day; and in Hospital D, each patient received eight slices of bread per day. In Hospitals A, C and D, the number of bread slices was the same for male and female patients. In Hospital B, on the other hand, the male ward was given three extra loaves of bread on two days of the plate-waste study which were intended to be served with supper with pasta and umvubo (sour milk and maize meal pap). At the time of data collection, there was no meal preparation schedule pinned to the wall; nor was there one in a file showing preparation, production and dishing times.

4.4.5 Mealtimes and distribution of food

All the food service units followed a standard delivery schedule when delivering meals, which determined which wards were the first and last to receive meals. On the three days of the plate-waste study, the time of delivery and serving of food to the two wards were recorded (Tables 4.23–4.26).

In Hospital A, the latest time to deliver breakfast was 09h23 and the latest time to serve supper was 16h14. The average gap between breakfast and lunch was less than three hours. In Hospital A, a late-night snack was served at 20h00 (two slices of bread with tea), with the average gap between the late-night snack and breakfast being more than 13 hours. In Hospital A, the average

time between the delivery of food to the ward and the serving of the food ranged from 10 to 20 minutes, except for supper where the meals were served 35 minutes after arrival on one of the days.

Table 4.23: Three days' delivery and mealtimes in Hospital A

Mealtimes	**Hospital A**	
Day 1	**Delivered**	**Served**
Breakfast	09h23	09h38
Lunch	12h49	13h08
Supper	15h48	16h04
Day 2		
Breakfast	09h10	09h30
Lunch	12h14	12h24
Supper	15h15	16h07
Day 3		
Breakfast	09h20	09h40
Lunch	12h30	12h40
Supper	15h40	16h14
Late night snack	20h00	

In Hospital B, the latest time to deliver breakfast was 09h00 and the latest time to serve supper was 16h35. However, the time lapse between the delivery of food to the ward and serving was as much as 75 minutes on the first day of observation. The situation improved on the days of the plate-waste study (Table 4.23), as did the serving of a mid-morning snack on Days 2 and 3. As indicated in Table 4.24 below, the gap between breakfast and lunch was significantly short, with breakfast served at 10h15 and tea and bread served at 11h02 and then lunch served two hours later. In Hospital B, a late-night snack was served at 19h00 (four slices of bread with tea) with the average gap between the late-night snack and breakfast being more than 14 hours.

Table 4.24: Three days' delivery and mealtimes in Hospital B

Mealtimes	**Hospital B**	
Day 1	**Delivered**	**Served**
Breakfast	09h00	10h15
Lunch	12h30	13h20
Supper	15h50	16h26
Day 2		
Breakfast	08h59	10h15 (Porridge)
Morning snack		11h02 (Bread and tea)
Lunch	13h05	13h23
Supper	15h49	16h35
Day 3		
Breakfast	08h40	08h57 (Porridge)
Morning snack		09h30 (Bread and tea)
Lunch	12h45	13h02
Supper	15h52	16h11
Late night snack	19h00	

Hospitals C and D did not face significant challenges in respect of compliance with mealtimes, with breakfast in Hospital C being served at 08h55. The average time lapse between delivery of food to the hospital ward and serving was between 11 and 12 minutes. Supper was served before 16h00 on at least one day in both Hospital C and Hospital D during the plate-waste study.

Table 4.25: Three days' delivery and mealtimes in Hospital C

Mealtimes	**Hospital C**	
Day 1	**Delivered**	**Served**
Breakfast	08h45	08h55
Lunch	12h03	12h23
Supper	16h10	16h20
Day 2		
Breakfast	08h15	08h32
Lunch	11h50	12h30
Supper	15h50	16h00
Day 3		
Breakfast	08h17	08h32
Lunch	12h40	12h51
Supper	15h35	15h50
Late night snack	19h00	

In both Hospital C and Hospital D, a late-night snack was served at 19h00. In Hospital C, the average time lapse between the late-night snack and breakfast was more than 13 hours. However, Hospital D served an early-morning snack at 06h00, making the gap between the late-night snack and the early-morning snack 11 hours.

Table 4.26: Three days' delivery and mealtimes in Hospital D

Mealtimes	**Hospital D**	
Day 1	**Delivered**	**Served**
Early morning snack	The day before (in the afternoon)	06h00
Breakfast	08h54	08h59
Lunch	11h50	12h00
Supper	15h40	15h49
Day 2		
Breakfast	08h15	08h25
Lunch	11h55	12h05
Supper	15h50	16h00
Day 3		
Breakfast	08h20	08h32
Lunch	11h53	12h02
Supper	15h49	16h00
Late night snack	19h00	

The study revealed that three of the four hospitals had implemented a bulk dishing system, using a designated delivery bakkie with a canopy to transport food from the hospital food

service unit to all kitchen wards (Appendix 7). Hospital D was the only hospital out of the four to use a plating system. No food warmers were used to retain the heat of the food delivered to the wards.

Food temperatures recorded randomly over the three consecutive days using a food thermometer in Hospitals A and B gave a lowest reading of 35 degrees Celsius and 58 degrees Celsius at different mealtimes. While Hospital C used a similar vehicle to that of Hospitals A and B, it used a trailer with food warmers to keep patients' food warm while it was being transported. Hospital D used trolleys to deliver food to the ward kitchens. In Hospitals C and D, food temperatures ranged from 64 degrees to 78 degrees Celsius, depending on the type of food served. The low temperatures of food in Hospital B resulted in high food waste on the days Morvite and stiff pap were served in both male and female wards, while high waste was observed in Hospital A when stiff pap was served.

Table 4.27: Examples of food temperature readings in the four hospitals

Mealtimes	Hospital A	Hospital B	Hospital C	Hospital D
Breakfast	68 °C	43 °C	72 °C	78 °C
Lunch	51 °C	49 °C	78 °C	71 °C
Supper	35 °C	52 °C	69 °C	64 °C

It was observed that in all hospitals, the responsibility of food services ended when the food left the food service units for delivery to the wards. Once the food was received in the wards, it became the responsibility of the nursing staff. In three of the four hospitals, dishing was done either by nurses and general assistants or by other patients under the partial supervision of general assistants. Dining areas were supervised by nurses and security guards stationed in the ward.

Critical food safety concerns were observed in Hospitals A, B and C in the areas of: (i) food-handling practices by patients, nurses and general assistants, including the wearing of proper protective clothing for dishing, such as white plastic aprons, a head cover/hairnet, gloves and disposable masks; (ii) the general state of hygiene of the ward kitchens; (iii) the holding temperatures of food after it was delivered to the wards and before it was dished at suppertime (16h00); (iv) the lack of appropriate equipment and utensils in ward kitchens, such as *bain-marie* inserts, food thermometers, recommended dishing spoons (Appendix 8), an urn, a microwave oven and airtight food containers to store spreads, tea, coffee, sugar, etc.

Dining areas were not appealing as places to eat meals as they were not adequately resourced. For example, dining tables either had no tablecloths or the tablecloths were not clean. Only one of the four hospitals had new, stainless steel tables and wooden chairs that were attached to the tables. The dining areas did not have mood-enhancing colours that would encourage eating. The cutlery and crockery materials and quality were not suitable for serving hot foods. For example, the plastic plates used were of poor quality and had lost their shape due to t being heated in microwave ovens for an extended period of time (Appendix 6A).

4.5 Factors affecting food provisioning

The factors associated with food quality and efficient food service delivery in public hospital food services were categorised as follows: food service budget allocation, infrastructure, human resources, training and development, and procurement of food. Each of these is discussed below.

4.5.1 Food service budget allocation and hospital bed capacity versus bed occupancy

The food service budget allocations for the 2019/2020 financial year for the four hospitals are summarised in figure 4.1 below. Hospital B was the largest hospital with 440 beds, followed by Hospital A with 400 beds and Hospital C with 314 beds, while Hospital D was the smallest hospital with 140 beds.

The budgets of Hospitals A and B differed by R2 523 026. The budget of Hospital C exceeded that of Hospital A by R1 031 684, which is strange because the difference in bed capacity is 86 beds with a bed occupancy of 20 patients (Figure 4.2). Hospital A was the least well-budgeted hospital of the four in terms of bed occupancy. The budget allocation for the four hospitals indicates inconsistencies on the estimated cost per patient per month and that is evident on the cost per capita illustrated in figure 4.1 below. The study could not determine whether the budget allocations were calculated based on bed capacity or history of bed occupancy. This highlights the inconsistencies in budget allocations for the public psychiatric hospitals, as revealed in bed capacity differences compared to average daily bed occupancy . Cost per capita for the four psychiatric hospitals differed in the 2019/2020 financial year (Figure 4.1). A significant difference was observed in per capita costs between Hospital A and Hospital D. In terms of the per capita budget allocation, Hospital B had the biggest budget while Hospital D had the smallest budget. The gap in per capita costs between the hospitals could be due to the general

food provisioning of each hospital and the provision of luxury, yet essential, food items such as yoghurt in Hospitals C and D.

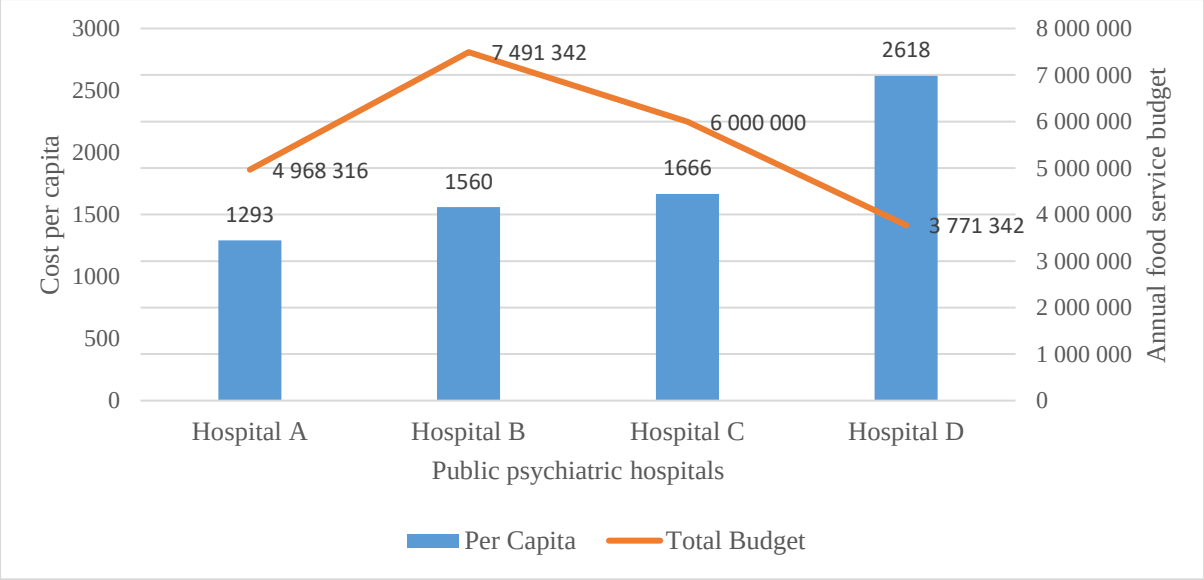

Figure 4.1: Budget per hospital (based on per capita cost) for 2019/2020 financial year

Hospital B was the biggest hospital in terms of hospital beds and bed occupancy. Occupancy levels were based on the numbers in the plate-waste study and also determined from the review of records. Reviewed documents included diet sheets reflecting daily patient numbers in the different wards. In total, the Eastern Cape Department of Health has approximately 1294 beds to accommodate psychiatric patients in the province.

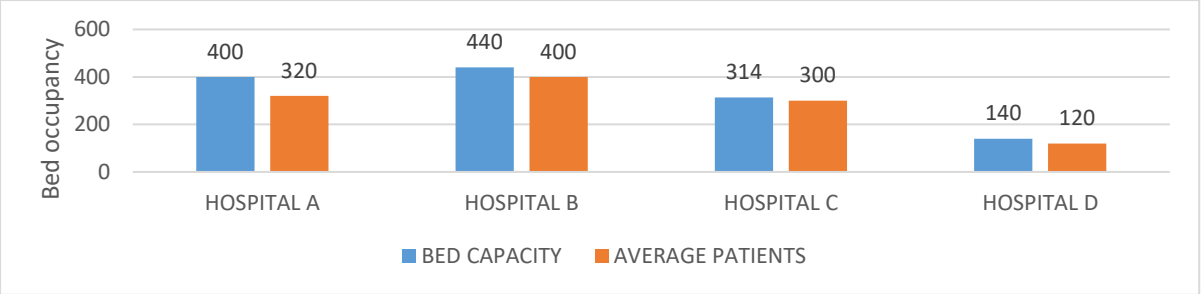

Figure 4.2: Hospital bed capacity vs. average bed occupancy per hospital in the Eastern Cape

4.5.2 Challenges regarding infrastructure and availability of equipment

The kitchen layout in all four hospitals was not favourable, which made full compliance with food safety regulations difficult. The food-flow process, i.e. from receipt of food in storage areas, preparation, production and dishing until the food was delivered to the wards, was a concern. In Hospitals A and B, the segregation of workstations was well managed and adhered

to by food handlers when executing their duties. Owing to limited space in Hospitals C and D, a duplication of workstations was observed. In these two hospitals, the production area was very constrained, resulting in the vegetable preparation areas overlapping with the food production area. There was thus a high risk of cross-contamination during food handling. None of the four hospitals had a therapeutic diet kitchen; the production of all meals took place in the main production area. However, all four hospitals had a separate dishwashing area.

The observations and the hygiene audit conducted in each of the hospitals revealed that food storage facilities (Appendix 9) and the segregation of workstations (meat area, fish area, vegetable area, etc.) were areas of concern. In addition, in Hospitals A and C, some essential industrial food service equipment had either been out of order for more than 12 months, was not in good working condition or was not available. The inadequate infrastructure impacted food provisioning in all four hospitals and food safety concerns were raised during the observations. Such food safety concerns related to the adequacy of (among other things): (i) ablution areas; (ii) basic handwashing infrastructure; (iii) temperature-controlled storage facilities; (iv) food warmers; (v) colour-coded food containers; (vi) conveyor belts; and (vii) food processors or industrial blenders.

The lack of essential equipment such as vegetable cutters, potato peelers and conveyor belts meant more time was spent preparing food (Table 4.28). In all four hospitals, food handlers hand-cut (Appendix 12) and cleaned vegetables to ensure that the portion sizes were suitable for the intended dish of the day, instead of devoting time to other important functions in the kitchen, such as deep cleaning and in-service training. Of the four hospitals, only Hospital A had a potato peeler but it was faulty and old, and further cleaning of vegetables was required after use.

In Hospital A, which had the largest storage facilities, a walk-in fridge was incorrectly used to store UHT milk which could have been stored at room temperature in the available storerooms where fresh fruit was stored. Hospital D was the only one of the four hospitals with no walk-in fridges or walk-in freezers. In this hospital, fresh fruit and fresh vegetables were stored at room temperature due to the lack of temperature-controlled areas. Hospitals B and C, on the other hand, had effective food storage systems. Other incorrectly used, essential equipment were *bains-marie* which were stationed in the ward kitchens in Hospital B. They were used to heat up water for patients to bath, and for mopping and cleaning of dishes, instead of being used to keep food warm on receipt thereof from the food service unit.

Table 4.28: Examples of essential equipment not available in all four hospitals

Hospital	Not available	Faulty and old
A	Vegetable cutter Potato peeler Industrial food weighing scales Food thermometers Food warmers	Industrial combi steamer Potato peeler
B	Vegetable cutter Potato peeler Industrial food weighing scales Food warmers	
C	Industrial food weighing scales	Industrial combi steamer
D	Conveyor belt Electronic food weighing scales (30 kg capacity) Potato peeler Vegetable cutter Food thermometers Food trolleys	

Participant B1, Hospital B, said: *"I procured bains-marie for the ward kitchens in an effort to comply with food safety regulations and make sure that patients receive warm food, but they are not used for the purpose intended."*

The study revealed that the boiler plant in hospital C contributed to the efficiency of food services and the quality of food produced. As reported by the key informants in Hospitals A and B, the operating hours for the boiler plants were 02h00–05h00 to ensure sufficient steam for the food service units. However, the boiler plants which generate steam for the food service units in hospital A and B, had an enormous impact on general food provision such as compliance to mealtime. The boiler plants' operating hours were due to the use of coal to operate the boiler in both hospitals. In Hospital A, the boiler was switched off earlier than normal, at 12h00. This resulted in the early production of supper meals to accommodate the operating hours of the boiler plant. The average time lapse between the production of supper and dishing was three hours.

Respondent 2B said: *"The steam is the biggest challenge, we are trying to fix the boiler, it's a long-term project I must be honest. We are trying to convert the boiler to being electrified: we are doing cost-benefit analysis, anything that is going to be acceptable."*

In addition, the poor quality of documentation for record-keeping purposes was due to the absence of functional computers and printers in the food service supervisors' offices. In three

of the four psychiatric hospitals, food service supervisors hand wrote their daily food service statistics. These forms included daily food dishing quantities, received stock and daily issue sheets. Only Hospital C had a supervisor's office that was well equipped with a computer, a printer and a telephone.

Respondent ASS said: "*We had a challenge: when we requested a computer, we were asked what we were going to do with a computer. They do not see a need for a computer in the kitchen."*

4.5.3 Availability of human resources

In all four psychiatric hospitals, all food service employees were permanently employed (by government). The study established that, according to the hospital organograms, three of the four food service units were headed by a qualified food service manager, while in Hospital D the food service unit was headed by an acting food service manager employed as a messenger at the hospital. In three of the four hospitals, the food service supervisors were second in command to the food service manager, just above food handlers in the hierarchy of the organisation. However, there were inconsistencies in the allocation of food handlers and food service supervisors, considering the number of patients and bed capacity. Hospital A had the highest number of food service supervisors (five). In contrast, Hospital B, the largest hospital, had only two supervisors – as did Hospital C. Hospital D was the only hospital that did not have a food service supervisor (Table 4.29). However, Hospital D had the highest number of food handlers, exceeding that of Hospital B as the largest hospital with more patients.

Table 4.29: Food service staff allocation in all four hospitals

Hospital	Food handlers	General assistants	Food service supervisors	Food service mangers	Total
A	12	4	5	1	22
B	8	6	2	1	17
C	15	-	2	1	18
D	17	-	-	1	18

A shortage of food service aids was raised as a major challenge for food provisioning in all four hospitals. However, Hospital A was highly resourced in terms of human resources. It was reported that the four general assistants in Hospital A were specifically employed to perform cleaning duties in the food service unit, unlike in Hospitals B, C and D where general assistants

were allocated to the food service unit on assuming duty due to the shortage of food handler posts in these three hospitals.

It was reported that some of the food handlers working in the food service units were not originally employed for entry-level food service aid posts but were allocated to food services on the assumption of duty even though they had not applied for food service aid posts. These new recruits included laundry workers, household aiders (cleaners), general workers and workshop assistants. The shortage of food handler posts was acknowledged by the food service managers to be a general problem across the four hospitals. It was also reported that hospital organograms were the major cause of the shortage in all four hospitals as they did not provide for sufficient food handlers given the patient numbers and meals to be produced.

Respondent C1, Hospital C, said: *"Some of them were temporarily allocated to the food service unit in 2010 and others in 2011 and they have been here since then, even though they were appointed as cleaners and laundry workers."*

Respondent B1, Hospital B, said: *"The staff we have in the unit are mostly employed as laundry aids and general assistants, while the laundry is not open yet, they have been allocated to the kitchen."*

The key informants interviewed at all the hospitals alluded to the fact that the food service units were understaffed, which constituted one of their most significant challenges. Advertisements for food service aid posts indicated that they were hiring individuals with no experience or two years of experience in a food-handling position. One key informant expressed concern about the quality of food prepared by individuals with zero experience if no training were given to new employees. Views differed regarding the impact on operations of redeploying personnel who had been employed for other posts, such as cleaning staff, laundry workers and workshop assistants.

Three of the participants affirmed that taking newly employed personnel who had no experience in food services did not affect their operations, as they provided in-service training to the new employees to ensure that they were equipped with the necessary skill sets. In contrast to these three participants' views, one of the participants contended that recruiting personnel with no experience had a negative impact on operations and food quality. The same participant added that the absence of training for newly employed individuals to become skilled food handlers was compounded by the lack of funds for training. What made things even more

difficult was that some newly employed recruits did not want to be told what to do in terms of food preparation, which was indicative of a negative attitude.

Respondent A1, Hospital A, said: *"Uninzi lwabantu abalapha abazi kwanto nge khitshi, abanye bathathwa egarage abanye behleli ecaleni kwendlu ithi lonto ibene miphumela kumgangatho wokutya okuveliswayo."*

"The majority of people employed here have no experience whatsoever in food preparation, actually they were taken from fuelling stations or were unemployed. This has a huge impact on food quality. The recruitment of food handlers with zero experience in the food service environment is a challenge because the newly employed candidates have no experience or knowledge about hospital food services."

Table 4.30: Food handler knowledge responses about food quality

No.	Statement	Strongly agree	Agree	Disagree	Strongly disagree	Not sure
1.	The mission and aim of the food service department is to ensure the production of meals that are safe for consumption, nutritionally balanced, and adequate in quality and quantity.	24 (86%)	4 (14%)	-	-	-
2.	Complying with regulations and laws relating to food production is important to me so that I can produce quality and safe meals for patients.	19 (68%)	9 (32%)	-	-	-
3.	The thawing of food must be done in the refrigerator, not in water or direct sunlight.	13 (48%)	10 (37%)	1 (4%)	-	3 (11%)
4.	Using a recipe and following it when preparing meals for patients is important for the quality of the end product that I will produce.	22 (76%)	4 (14%)	-	-	2 (7%)
5.	Meals prepared in hospital kitchens for patients should be of good quality, have a good taste and an appetising appearance.	24 (86%)	4 (14%)	-	-	-
		102	61	1	-	5
	Average score: 73%					

Food handlers' knowledge of the food services objective and basic food services knowledge in respect of food production were assessed (Table 4.30). Most (86%) of the food handlers were

knowledgeable about the food service objective but scored the lowest on thawing procedures. In this regard, some food handlers were not sure of the correct thawing procedures.

4.5.4 Food handler attitudes and morale

Factors that may have affected staff morale and attitudes across the four psychiatric hospitals were observed. General factors included: (i) whether there were well-resourced changing rooms (Appendix 10); (ii) whether there was accredited training; (iii) whether there were sufficient food service uniforms; (iv) whether food equipment, such as ovens, steam pots and boiler infrastructure, was in good working order; and (v) the food service structure. When participants who were managing the hospital food service units were asked about the possible causes of tension, poor staff attitudes and the morale (both low and high) of food handlers, the key informants expressed dissimilar views.

Participant A2, Hospital A, said: *"Eyonanto mna endicinga ukuba yenza la tension yi workload."*

"One of the major contributors to poor tensions is the workload."

Participant A1, Hospital A, said: *"When I arrived here, I noticed that it was tense and the morale of staff was very low. I have tried team building programmes and everything in my power to improve tensions and staff attitudes and this year I have given up on improving staff attitudes."*

Participant B1, Hospital B, said: *"It is because we have meetings every month and we talk in effort to raise concerns and I do conflict management."*

4.5.5 Food handler training

Only four food handlers had worked (for more than 30 years) in the food service units. However, of these four, only two had received relevant training for their scope of work (in 2007). Of the 28 participants working as food handlers, none had been trained in or had attended a course on food preparation or safety during the previous 10 years. It was learnt that in the 2018/2019 financial year, only seven food handlers had received accredited training of any kind. In Hospital C, one food handler reported that he had been trained in firefighting, while in Hospital D six participants had received training in occupational health and safety (Table 4.32)

Common problems such as a lack of funding for training and the centralisation of training by Head Office were highlighted by key informants when they were asked to reflect on and share their views about skills development and training of food handlers. When one key informant was asked about the training provided to food handlers in the 2018/2019 financial year or the training scheduled, the informant emphasised that there was no training budget.

Respondent A2 said: "*Azikho mntasekhaya because there is no budget. They say they need infection control; others have been to computer iya depender entwini ukuba ufuna utrainwa kwi ntoni na. Akukhe kubekho mntu uthi ufuna ukuba ne diploma yakwa nutrition, bonke bafuna uphuma kula section. Eyonanto ke olower category base bangafuni uphuhliswa kulento bayenzayo bafuna inursing."*

"They say they need training on infection control; others have been on computer training. However, at times training needs differ and depend on what individuals want to be trained on. There is no food service handler that says they want to acquire a diploma in nutrition, they all don't want to be in that section. Another challenge about lower class category is that they do not want to be trained on their current jobs, they want to do something else, especially nursing."

The study explored why food handlers in Hospital A opted for nursing as a career path. It was found that Hospital A prioritised the upskilling and training of nursing staff over food service staff. The training of nursing staff was common across all hospitals, with 80 of the nurses being trained in areas critical to nursing practice.

Respondent D3 said: "*Ekuqaleni konyaka mali lo sazenza izicwangciso zokuba mabayo qeqeshwa sayi identifier ne ndawo ezokuba qeqesha, kungelishwa ke ukuba akuphelanga no June losidlule kuye, safumana umyalezo othi yonke ebesiyicwangcisele ukutrainer abantu bethu lomali asizoyifumana njengoko ingundlunkulu oyakuthi aququzekele uqeqesho lwabasebenzi."*

"*At the beginning of this financial year, plans were made to train food handlers and a service provider was identified. Disappointingly, before the end of June, we were informed that all plans that were made to train staff were to be cancelled as funds were not going to be allocated as Head Office would be the main coordinator for trainings."*

Respondent A1 added: *"Even if I go and submit my training needs on time at regional office, I am told that there are no funds. It would be very helpful to invest on training, but the centralisation of the training budget is a huge challenge."*

The majority of food handlers (71.4%) reported that training in food production and food quality would be beneficial to their personal development (Table 4.31). About 20% of food handlers did not see the need to attend food preparation training as they had enough experience in food services.

Table 4.31: Food handler perspectives on staff training

Training in food production and food quality would be beneficial in improving my skills		
Categories	**Number (n)**	**Proportion (%)**
Strongly agree	20	71.4
Strongly disagree	8	28.6
I believe I do not need to attend food preparation training as I have enough experience in food services		
Categories	**Number (n)**	**Proportion (%)**
Strongly agree	3	10.7
Agree	3	10.7
Not sure	2	7.1
Disagree	13	46.4
Strongly disagree	6	21.4
Missing	1	3.6

Some of the longest-serving employees from two of the four hospitals last received training appropriate to their core job functions of food preparation and food production between 2007 and 2010. The longest-serving food handlers had between 20 and 34 years' working experience in the psychiatric hospitals. In exploring why food handlers wished to venture into a nursing career, as indicated by some of the key informants, it was found that training was not as scarce a resource in the nursing component as it was in the food services component. The number of trained nursing participants gave impetus to the desire for food handlers to move to the nursing.

Regarding the question of whether the management of the training budget was centralised by the provincial Head Office, key participants had different views. Some stated that the nursing

budget was not centralised, while others indicated that they lacked sufficient information about the nursing training budget. Trainings provided to food handlers are as shown in Table 4.32.

Table 4.32: Reflections on training provided, as reported by food handlers in all four hospitals

Question: How many times per year do you receive relevant skills training for your current post?			
Participant	**Participant responses**	**Training provided**	**Year**
F1	0	-	-
F2	0	-	-
F3	0	-	-
F4	0	-	-
F5	1	-	-
F6	1	-	-
F7	0	-	-
F8	1	Cooking, kitchen and Batho Pele principles	2010
F9	0	-	-
F10	0	-	-
F11	0	-	-
F12	1	Occupational health and safety	2019
F13	0	-	-
F14	0	-	-
F15	1	Fire fighting	2019
F16	0	-	-
F17	0	-	-
F18	1	Occupational health and safety	2019
F19	0	-	-
F20	1	Occupational health and safety, basic computer skills and catering	2019
F21	1	Occupational health and safety	2019
F22	2	Occupational health and safety	2019
F23	1	-	-
F24	0	-	-
F25	1	Occupational health and safety	-
F26	0	-	-
F27	1	End-user computing, effective communication, and food and nutrition	2007
F28	0	-	-

Table 4.33: Pearson Correlation between compliance with regulations and training of food handlers

		Compliance with laws and regulations pertaining to food production is important in order to produce quality and safe meals	Training in food production and food quality would be beneficial in improving my skills
Compliance with laws and regulations pertaining to food production is important in order to produce quality and safe meals.	Pearson Correlation	1	.548**
	Sig. (2-tailed)		.003
	N	28	28
Training in food production and food quality would be beneficial in improving my skills.	Pearson Correlation	.548**	1
	Sig. (2-tailed)	.003	
	N	28	28
**. Correlation is significant at the 0.01 level (2-tailed)			

	Mean	Std. deviation	Number (n)
Compliance with laws and regulations pertaining to food production is important in order to produce quality and safe meals.	1.25	.441	28
Training in food production and food quality would be beneficial in improving my skills.	1.29	.460	28

The correlation coefficient between compliance with laws and regulations and training of food handlers was statistically significant at r = 0.548, p = 0.003 (Table 4.33). The strength of the linear correlation was 0.548 in the positive direction. This suggests that there was a relationship between perception of training and perception of the importance of compliance with regulations.

4.5.6 Food specifications and procurement

Supply chain and procurement was identified as one of the problem areas affecting food provisioning in hospital food services in all participating hospitals. The incorrect estimation of food quantities against specifications was highlighted as a challenge which at times resulted in stock shortages in hospital dry stores managed by supply chain and procurement. Such occurrences prompted the borrowing of food from nearby hospitals to ensure that patients could be fed. Participants from supply chain highlighted that they did not have any input in the writing of specifications and relied on the specifications submitted by food service managers in order

to carry out the process of tender advertising. In some hospitals, food service managers reported a need for assistance in drafting specifications.

However, one of the participants in the supply chain section affirmed that as supply chain officers, they were unable to assist as they were not specialists in the field of food services and relied on the input of the food service managers in terms of the quality and quantity of food items required. The study established that contracts were managed at the district and institutional levels across the four hospitals. Two of the four hospitals managed the process of advertising and awarding tenders at institutional level, while tender advertising and awarding were facilitated by district offices in the case of the other two hospitals. The district office for Hospital D was within easy reach, i.e. approximately 7.5–10 minutes and 7.5 kilometres away, while the district office for Hospital A was approximately 1.52 hours and 140 kilometres away. Delays with contracts managed at the district level were highlighted as resulting in food shortages.

Key informants and some participants reported that inconsistencies with deliveries by suppliers were among the challenges faced by hospitals at the time the study was conducted. The reasons for suppliers failing to deliver varied between hospitals, with Hospital A reporting that delays were the result of suppliers not having enough funds to continue rendering services. Another participant alluded to the fact that suppliers often did not deliver groceries and other food items because of delayed payments by the finance department. However, participants working in supply chain in all four hospitals maintained that suppliers were paid within the 30-day period stipulated in the supply chain regulations if all documents submitted were valid and correct for payment purposes. However, receiving deliveries without invoices and delivery notes, incorrect invoices and the late submission of invoices by suppliers were found to be the causes of payment delays.

The study revealed inconsistences in the process of managing and addressing supplier challenges, with some hospitals having stringent processes in place, which resulted in strong compliance by suppliers. As reported by some of the participants, stringent processes included terminating the contract with the supplier after the latter's failure to deliver for the second time and flagging the supplier for non-conformance.

4.5.7 Supplier financial challenges

In one of the hospitals, the unavailability of funds was one of the major challenges that resulted in deviations from the menu and the non-provision of certain food items. Only Hospital A reported having challenges with suppliers who were in breach of contract, such as delivery of substandard food items, failure to deliver at the stipulated times and non-delivery.

In Hospital A, for example, a supplier contracted to supply milk and milk products failed to deliver as per the contractual agreement with the hospital due to insufficient funds to procure the ordered stock . The milk supplier (Supplier 1) requested a two-week extension of the set delivery date to apply for funding from the Eastern Cape Development Cooperation (ECDC), a fund management company. This resulted in Hospital A receiving milk and milk products from a different supplier (Supplier 2) under a contract that had ended in January 2019. Surprisingly, the order number for the milk contract that ended in January 2019 had not been closed in the system. This was found to be in conflict with supply chain regulations and if audited would have been deemed irregular expenditure since there were two active contracts for the same commodity with food items received simultaneously by the food service unit.

Participant A1, Hospital A, added: *"Sinalo challenge, njengangoku u Supplier ABC…bavele bathi andizu dilivarisha ningeka ndibhatali" ucela ndimnike two weeks from 6 July to deliver on 18 to 19 July so that ayoboleka imali eECDC."*

"We are in the same challenge currently as supplier ABC just informed me saying 'I will not deliver until I have been paid'. The supplier asked me to grant him two weeks from 6 July to 18/19 July while he goes to ECDC to apply for a loan."

When asked if there was support from the Department of Health legal services when challenges appeared regarding supplier non-conformance, one of the four participants affirmed that there was no support from legal services in their institution.

4.5.8 Food quality control and sample evaluation

When the four participants managing the hospital food service unit were asked about quality control measures (sample evaluation) to ensure the optimal quality of delivered food items, they indicated that they did not conduct sample evaluations prior to awarding tenders. These participants further reported that they did not have sample evaluation committees in their institutions. However, two participants stated that they organised site meetings with suppliers. One participant asserted that the intention behind conducting site meetings was to provide brief

explanations of the product/service required. The second participant reported that the rationale for site meetings prior to awarding a tender was to ensure compliance with food safety standards and to see if the product to be delivered met the given specifications. These two participants discussed the importance of clear specifications when drawing up food requirements as a way of measuring/controlling food quality from suppliers.

In terms of contract management, it was reported that two of the four food service managers did not have sufficient information about supply chain and procurement, including contract registers, details of the top competing suppliers in bids, what brands were quoted by the suppliers, foods that were zero-rated for VAT and various pieces of procurement legislation.

4.6 General hygiene audit results

The purpose of hygiene audits in food production and manufacturing environments is to provide a comprehensive inspection of food-processing facilities to evaluate their compliance with established food hygiene and safety standards as well as companies' specific hygiene policies and practices (Table 4.34). The audit conducted in all four hospitals was guided by the Foodstuffs, Cosmetics and Disinfectants Act of 2002 which is the standard regulation (Regulation R368) used in food service establishments.

Observations revealed that standard receiving procedures in hospital A and D were not adhered to while in hospital B and C, food deliveries were vigilantly executed by the food service supervisors in charge to ensure compliance with food specifications and safety requirements. In both hospital B and C, there are designated food receiving areas, whilst hospital A and D had no standard receiving area. Furthermore, delivery vehicles in one of the hospitals did not comply with regulations stipulated in the Foodstuffs, Cosmetics and Disinfectants Act of 2002. In this regard, deliveries were received with no vehicle inspection having been done to determine compliance with food safety standards; nor were temperature readings taken in the vehicles on site prior to the goods being offloaded. The fact that cleaning schedules had not been implemented resulted in a failure to plan cleaning duties. For example, a walk-in hospital freezer was a hazard to the food handlers at it was frosted over with ice (Appendix 9). This could have been cleaned if a cleaning schedule had been in place.

The study elucidated a number of common findings which raised critical concerns about food provisioning in terms of quality, nutrient status and food safety. These concerns included: (i) insufficient compliance by food handlers and food service supervisors with personal hygiene

standards; (ii) inadequate provision made for uniforms for food service personnel; (iii) absence of a food service cleaning schedule; (iv) non-adherence to correct procedures for food deliveries at food service units; (v) use of hazardous cleaning chemicals, such as steel wool and ammonia/Handy Andy; (vi) inefficient methods of delivering food to the wards; (vii) inappropriate food-handling methods and dishing utensils at ward level; (viii) inefficient food waste disposal arrangements; (ix) inappropriate, torn tablecloths (Appendix 11); and (x) open access to the food service department by unauthorised persons, such as patients coming from wards to wash dishes, colleagues visiting food service personnel and workshop personnel not wearing hairnets.

In Hospital A, food waste was discarded incorrectly in black and yellow bins which were not appropriate for storing contaminated food waste. In addition, the waste bins were kept in the food service unit despite there being a skips area outside. The skips area was used to store paper waste and was not used for its intended purpose. In contrast, Hospital B's and C's contaminated food waste (waste from patients' plates) was collected by Compass Waste Services in appropriate storage containers kept in the ward kitchens. Other food waste from the food service units in Hospitals B and C was collected by a local farmer. In Hospital D, food waste from the wards was correctly stored in Compass Waste containers, while food waste from the food service unit was stored in uncovered Compass Waste containers.

None of the four psychiatric hospitals had a valid certificate of acceptability (COA) from an authorised local environmental health official authorising the handling, preparation and transportation of food as stipulated in Regulation R638 of the Foodstuffs, Cosmetics and Disinfectants Act of 1972. In essence, the four psychiatric hospitals prepared and provided meals to patients in the absence of the required certification, resulting in the Department of Health being in contravention of Regulation R638 of the Act. The heads of food services were in the process of securing audits by local environmental health authorities in two of the hospitals, while two of the heads of food services did not know what a certificate of acceptability was; nor did they have plans to have an audit performed to ensure compliance.

Table 4.34: Summary of general hygiene audit on compliance with food safety in all four hospitals

Hospital	COA certified	Provision of FSU uniform	Cleaning schedule	Waste disposal	Controlled access to FSU
A	No	Yes	No	No	No
B	No	No	No	Yes (Compass Waste)	Yes
C	No	Yes	No	Yes	Yes
D	No	No	No	No (Compass Waste)	No

4.7 Nurses' perceptions of the nutritional needs of patients

To explore the perceptions of nurses regarding the nutritional needs of psychiatric patients, 50 nurses participated in the survey. Nurses from all four hospitals were found to be actively involved in the provision of patient food and demonstrated an understanding of patient diets. In hospitals where a patient was unable to eat due to illness, nurses assisted. However, if they were unable to do so for one reason or another, a general assistant or a security guard assisted. When food was left over in the kitchen, especially during the breakfast mealtime, patients who wanted more food were offered seconds. The nurses understood what foods certain patients preferred and knew patients' diets.

The majority (90%) of nurses were aware of the significant role they played in the prevention of malnutrition in hospitalised patients. The majority of nurses understood the risk posed by malnutrition to the health of hospitalised patients, although they were not trained in calculating the BMI of patients. The lack of resources to conduct nutrition screening and assessment were highlighted as challenges that nurses across the four hospitals encountered.

Ninety-five percent of nurses highlighted the importance of institutional management support for patient nutritional care and awareness programmes (Table 4.35). In contrast to the finding that food handlers were not undergoing critical training in food services, the study found that 80% of nurses were participating in courses that were critical to nursing. The themes of the training provided to the nursing staff included: (i) handling aggressive patients; (ii) advanced psychiatry; (iii) infection control; (iv) medication; (v) resuscitation; (vi) risk management; (vii) basic life support drill; (viii) HIV/TB management; and (ix) waste management.

Table 4.35: Nurses' perceptions of the nutritional needs of psychiatric patients

Nurses have a significant role in preventing iatrogenic malnutrition			
Variable	**Categories**	**Number (n)**	**Proportion (%)**
Role of nurses in malnutrition prevention	Strongly agree	22	44
	Agree	23	46
	Not sure	1	2
	Strongly disagree	1	2
	Missing	3	6
Malnutrition poses a serious risk to the health of hospitalised patients			
Variable	**Categories**	**Number (n)**	**Proportion (%)**
Risk of malnutrition to in-patients	Strongly agree	32	64
	Agree	13	26
	Not sure	1	2
	Missing	4	8
Institutional management support for patient nutrition care and awareness programmes			
Variable	**Categories**	**Number (n)**	**Proportion (%)**
Management support	Strongly agree	25	50
	Agree	21	42
	Not sure	2	4
	Missing	2	4

Conclusion

There was a concern that if the issue of adequate nutrient provision in all four hospitals was not addressed, it could heighten the risk of malnutrition and result in some patients having a prolonged stay in hospital. The results of this study indicate that there are multifactorial influences on the quality of food provisioning in public psychiatric hospitals in the Eastern Cape. Such influences include non-compliance with the national food policy, the absence of standard operating procedures that are in keeping with the context of each institution, and insufficient investment in food service infrastructure and training of food service personnel, including food service managers.

CHAPTER 5

DISCUSSION

5.1 Introduction

This chapter discusses the key results of the study and draws conclusions from the findings that emerged. Limitations of the study and recommendations, respectively, are also highlighted and discussed.

5.2 Theory of compromised behaviour

The study was guided by the theory of compromised eating behaviour, which was used to understand the processes affecting dietary intake and food acceptability among patients. According to this theory, eating behaviour is grounded in the strong belief that a patient determines their dietary intake. Alonso (2015) asserts that older adults prefer traditional meals and familiar foods, while unfamiliar foods are associated with an unwillingness to eat which results in diminished nutrition. Similarly, this study showed that patients enjoyed their meals when food service units provided meals that were familiar and acceptable from a cultural and/or religious perspective compared to western menus with unfamiliar food items. This may have contributed to food waste not being observed on the days when cultural meals, such as umvubo (dry maize meal pap with sour milk) and umngqusho (samp and beans), were served.

5.3 Description of patients' profile and energy requirements

The reference profiles of patients selected for the study were created from information on psychiatric patients in the psychiatric hospitals in the Eastern Cape on the days of the plate-waste study. The patients (both male and female) were on a normal diet, between 18 and 55 years old, and had no difficulties in swallowing or any other additional nutrient needs. The body mass index (BMI) was calculated for both male and female patients, using the Mifflin St Jeor formula, to determine nutrient requirements for body functions. The BMI, previously known as the Quetelet Index, is a measure of the nutritional status of adults and is defined as a person's weight in kilograms divided by the square of the person's height in metres (kg/m^2) (Rashad, Grossman & Chou, 2005). The study found that the dominant gender was African males, followed by African females and a minority of other races. Using a descriptive and analytical approach, essential nutrients needed by hospitalised patients in the four psychiatric

hospitals were analysed, based on the plate-waste study conducted and the energy requirements of both male and female patients.

5.3.1 Energy requirements of adult psychiatric patients

Nutritional intake is fundamental to weight management and future physical health (Teasdale et al., 2017). Antipsychotic medications induce greatly increased hunger, decreased satiety and increased cravings for sweet food and drinks. The effects of such medications include rapid weight gain with associated metabolic abnormalities (Teasdale et al., 2017). Hospitalised psychiatric patients may face the risk of weight gain if the provision of the three macronutrients is not adequately monitored.

Total energy is the sum of three energy-yielding nutrients (carbohydrates, fats and protein). An adequate intake of carbohydrates is required to provide glucose to support normal cellular activities such as protein synthesis, secretion of hormones and growth factors (Harris & Fraser, 2004). Excess total energy in meals may predispose patients to emerging obesity, diabetes, hypertension and other chronic diseases. Overweight and obesity are epidemic in people with serious mental illnesses (Daumit et al., 2013). On the other hand, meals with insufficient total energy have been shown to trigger the onset of malnutrition in hospitalised patients in Gauteng province (Jiyana, Ncube & Nesamvuni, 2018). Three of the four psychiatric hospitals in this study provided total energy that was adequate, with one hospital providing total energy that was lower than the specified requirement.

5.3.2 Macronutrient provision

Protein is necessary to initiate a healthy inflammatory response in the healing process (Harris & Fraser, 2004). Protein-energy malnutrition may result in immunodeficiency, with increased frequency and severity of infections as well as atrophy of the thymus gland and wasting of the peripheral lymphoid tissue, and impairment of cell-mediated immune responses. The average protein provided in the planned menus in three of the hospitals was in line with patient nutrient needs and met the RDA for protein of 90–120 g. One hospital, though, provided less protein than was required. These findings corroborate those of Jiyana et al. (2018) who assessed the nutritional content of planned menus in eight public hospitals in Gauteng. In that study, six of the eight hospital menus were within the RDA range for protein. The possible consequence of inadequate protein intake by hospitalised patients over a prolonged period is protein deficiency. Protein deficiency is associated with negative clinical outcomes, such as delayed wound

healing and tissue repair, which may prolong patients' hospital stays and heighten the risk of repeated admissions. Signs and symptoms of protein deficiency include reduced lean body mass, heightened risk of infections and bone fractures, and reduced muscle strength and function (Harris & Fraser, 2004).

5.3.3 Fat and added sugar provision

In some of the four hospitals, patients obtained most of their fat from consuming meat which was not trimmed to remove excess fat. Another source of fat was cooking oil (vegetable oil) and spreads which were not portion controlled. Approximately 40g of margarine was given to the patients to spread on two to four slices of bread. A high fat consumption in their diet may have predisposed patients to cardiovascular diseases (CVDs) as patients were not physically active during hospitalisation. In three of the four hospitals, during the study period only one hospital had a planned physical activity (soccer) in which male patients participated. In addition to high fat provision was high sugar provision (Appendix 6E).

The high provision of added sugar (refined sugar) predisposed patients to weight gain. Relatively large amounts of refined sugar and processed foods have been shown to increase the risk of depression (Solomon, Zukier & Hamadeh, 2010). Additionally, the high provision of sugar and fat in the patient's diets across the four psychiatric hospitals may have contributed to the total energy consumed. Although sugar provides less energy than fat, it may have contributed to the energy density of foods and beverages consumed. It is imperative to ensure moderate intake of refined sugar in effort to maintain a healthy diet during hospitalisation. A moderate amount of sugar is classified as approximately 10 percent of the total energy intake per day (Welsh et al., 2010).

A cross-national study of six countries established a strong, positive correlation between national sugar consumption and rates of depression (Solomon et al., 2010). Dietary advice on the use of energy-rich beverages together with increased physical activity may help prevent weight gain among this population (Elmslie et al., 2001). People with a chronic mental illness often engage in lower levels of physical activity and have high rates of smoking (Teasdale et al., 2017). High rates of smoking were observed in the four hospitals, particularly among male patients.

5.3.4 Macronutrient and micronutrient provision

Fruits and vegetables are sources of vitamins and minerals, such as vitamin C, vitamin A, dietary fibre, folate and potassium, which are essential in preventing heart disease, cancer and other illnesses. When vitamins and minerals are under-consumed, the likelihood of nutrient deficiencies is relatively high. Deficiencies over long periods can result in clinical conditions such as scurvy, which is a vitamin C deficiency (Halcrow et al., 2014). The finding of significantly low vitamin C provision in all four hospitals is similar to the finding reported by Swartz (1996) that malnutrition in the form of scurvy was due to a lack of vitamin C in the asylums in the Eastern Cape. However, in this study clinical signs were not assessed. The low intake of vitamins and minerals, in particular, may have been due to several factors in all four hospitals: (i) inadequate issuing of raw food for production; (ii) non-compliance with food ration scales for health establishments; and (iii) inadequate provision of fruit and fruit juices. Findings from this study are consistent with those of Jiyana et al. (2018) who reported a low provision of vitamin A, folate and dietary fibre in eight Gauteng public hospitals. Inadequate provision of these essential vitamins and minerals exposes patients to nutrient deficiencies and compromises their immunity, while also increasing their susceptibility to infections (Jiyana et al., 2018).

5.3.5 Variety of foods provided

Monotony of diet in institutional care and the timing of meals also impact nutritional wellness. Compared with the general population, people with a mental illness consume a diet that is more energy dense, highly processed, high in salt, and contains less fruit and vegetables (Teasdale et al., 2017). The findings from this study are in agreement with the views of Teasdale et al. (2017). In one of the four hospitals, fruit was not provided to psychiatric patients at all, while the provision of fruit and vegetables in general was inadequate and did not meet the RDA.

Generally, the menus of the four hospitals lacked variety and were monotonous. Although the menus were planned so as to have a wide variety of food items available for the patients, non-adherence to the planned menus was seen to be a factor contributing to the monotony of the meals served in the four hospitals. The study observed the same colour and texture of vegetables being served on the same day for lunch and supper. The vegetables comprised peas, carrots and onion as well as starches such as potatoes served both in a lunch stew and again at supper. The most-served vegetables were carrots, butternut and pumpkin, which might have contributed to the food waste observed in two of the four hospitals.

The findings of this study corroborate those of Casagrande et al. (2011) which revealed that interventions are needed to improve the dietary intake and thus health of persons with serious mental illnesses as this population group is at high risk of nutrient deficiencies and CVD. A change of menus in line with the change of seasons (particularly from winter to summer, and vice versa) may help to add variety and interest to menus by introducing different food textures and colours suited to each season, thereby addressing the monotony of the eight-day cycle menus. The fixed eight-day cycle menus provided in the four psychiatric hospitals did not change with the change of season. Changing the hospital menus to reflect seasonal variations and adjusting the length of the menus may help to reduce the risks of malnutrition among hospital patients.

5.4 Description and implementation of the provincial menu

A menu is a list of foodstuffs formulated to guide people in what is to be served, how it will be prepared, the quantity to be served and the serving times (Dlova, 2018). The purpose of the provincial menu, which was meant to be used in the four psychiatric hospitals, might be to provide a guide to the types of foodstuffs to be provided, the resources necessary for the provision of meals, the human resources required to produce the meals and the budget needed for an operational food service.

It was not possible to determine which hospitals used the provincial menu as each hospital had a different menu which they regarded as a provincial menu. This led to different foodstuffs being served across the four hospitals. The standard menus used in all four hospitals were European menus which had dishes that were not acceptable and/or familiar to the majority of patients and this contributed to food waste and the low intake of certain foods, such as pasta dishes. This was in conflict with the objective of the Department of Health regarding hospital food services, which is “to provide meals that are culturally and religiously acceptable to all patients”.

Food items that were not generally provided across the four hospitals included pork, stiff pap, sour milk (amasi), maize meal pap (umphokoqo), juice and yoghurt. This was surprising as the demographics of the patients indicated that the majority of patients in the four hospitals were of African descent. This warranted the menus used in the four hospitals being adjusted and meals being provided that were culturally acceptable but without their nutrient composition being compromised. The provision of sour milk and maize meal pap (umvubo) at least twice a week would add calcium to patients’ diet and might contribute to increased food intake.

5.4.1 Use of recipes during production

The use of standardised recipes encourages uniformity in the quality of dishes prepared. A standardised recipe is a recipe that has been tried and tested for quality and yields the same results using specific ingredients and preparation methods, irrespective of who prepares the dish (DoH, 2010). None of the hospitals in this study used a recipe to prepare their meals. Food handlers in certain hospitals reported that they did not know if recipes were available, while those in other hospitals revealed that recipes were in the manager's office. Interestingly, during the document review process, recipes were found filed in the managers' offices. The failure to comply with the standard recipe usage during food production might have contributed to the inadequate quality of meals produced, which in turn would be evident in the appearance, taste and texture of meals provided to patients.

5.4.2 Production schedule: Food quality and food safety outcomes

Non-adherence to food preparation schedules was a major contributing factor in the quality of cooked food in Hospital A. This could have been due to a lack of constant supervision of food handlers by food service supervisors, which could have impeded the early production of meals. The four hospitals lacked food preparation schedules in the preparation areas. In Hospitals B, C and D, food preparation took place at acceptable times, thus allowing food to be dished within 30 minutes of cooking. In Hospital A, however, as soon as the supervisors had finished their daily issuing of groceries the food handlers proceeded with the cooking of meals. This may have been made possible by lack of supervision by food service supervisors on duty as well as well as ignorance or lack of knowledge.

On an observation day, a particular food handler defrosted chicken livers that were intended to be served at supper time. The chicken livers were pre-boiled (defrosted in hot water with plastic packaging not removed) at 07h46, even though they were only meant to be served at 16h00. Furthermore, instead of correctly defrosting frozen food in the refrigerator, which is the safest method to minimise bacterial growth, the food handlers expedited the process by using hot water in plastic containers, which had the potential to release harmful plastic material into the prepared dish. This affected the quality of the dish as the end product was over-cooked, dry and had a pale colour. On the same morning, dishes to be served for lunch were also cooked early.

The food preparation and storage also posed serious health risks as the dish was held at room temperature from 08h00 (at danger zone between 5° – 60°C) until 12h00 when it was reheated

and later cooled after cooking and later dished at 15h00. The two-hour rule for food preparation states that potentially hazardous foods, such as poultry and poultry products must be discarded when left at danger zone temperatures for more than two hours (Walker, Pritchard & Forsythe, 2003). In the case of hospital A, this rule was not adhered to. Chicken livers were defrosted in boiling water with their original plastic packaging and held at room temperature from 7h36 and later reheated to add vegetables such as carrot and peas. Once cooked the dish was cooled again and later dished for consumption and delivery to the wards at 15h00. Hot food must be kept hot at 60°C or above and cold food cold below 5°C to avoid bacteria from growing rapidly (Walker, Pritchard & Forsythe, 2003).

5.4.3 The time gap between the last meal and breakfast

The times for breakfast and lunch in two out of the four hospitals were not fixed, although supper was served at fixed times across the four hospitals. This was because of the specific times that food service units closed for food service staff to go home. In three of the hospitals, the fasting period between the last meal of the day and breakfast the next morning was around 13 hours. This was in conflict with the Policy for Food Service Management in Public Health Establishments (2010), which states that the fasting period between the last meal and breakfast should not exceed 12 hours. The long gap observed may have been due to the food service units' operating hours, the late serving of breakfast and infrastructural challenges, such as boiler outages.

r Energy restrictions are known to have numerous health benefits, such as reducing the risk of cardiovascular diseases, improving insulin sensitivity in diabetes, alleviating oxidative stress and enhancing cognitive functions (Zhang et al., 2015). According to Zhang et al. (2015) both basic and clinical studies indicate that short-term energy restrictions may stimulate an antidepressant efficacy in depression, providing a novel avenue for treatment. However, prolonged energy restrictions, including fasting or severe dietary restrictions, inevitably cause damage to neurons and trigger exaggerated depressive behaviours.

5.5 Distribution of meals to hospital wards

The mode of food distribution from the hospital food services to the hospital kitchens was a contributing factor in the lower temperatures of food being dished for the patients, because the trolleys or carts had no insulated food warmers. The study found that the temperatures of food delivered by two of the four hospitals that used a bulk dishing system were below 60°C which

is the recommended temperature for hot foods. In this respect, food was normally served at a danger zone temperature (5–60°C).

In Hospital A, the food service manager procured *bains-marie* which would be heated with water a few minutes before the food was to be delivered. What is disheartening, though, is that these *bain-marie* containers were not used as intended, but were instead used to heat water for patients, dishes and mopping. Only one of the four hospitals had food warmers that were effectively used for their intended purpose, with food temperature readings ranging from 67° to 72°C before being served to patients.

Food safety is the responsibility of all individuals involved in the food chain – procurement, preparation, production, delivery to the wards and receipt of food in the wards – before the food reaches the patient. Ward kitchens are food-handling areas and staff responsible for food handling should observe the same levels of food safety and personal hygiene as other food handlers in the food service units. Ward kitchens are usually the responsibility of the nursing staff who do not always receive the necessary training. This should include understanding the importance of serving meals within 15 minutes of regeneration and discarding delayed meals as well as the drawbacks of reheating food in microwave ovens (Barrie, 1996).

Food safety involves having the assurance that food will not cause chemical, biological or physical harm to the consumer when it is prepared and consumed as intended (Merieux Nutrisciences, 2018). In three of the four hospitals, the absence of proper protective clothing to conduct safe food handling in the wards, such as disposable plastic aprons, hairnets, and disposable (deli) gloves and biocide, was a major factor contributing to food safety risks once the food was received in the wards. Moreover, the lack of hand-washing facilities in the ward kitchens was another major risk which could possibly lead to food contamination and diseases such as cholera. It was concluded that patients and general assistants who dished in the wards were not knowledgeable about the importance of food safety and the implications for people's health.

5.6 Food intake: The effect of presentation in dining areas

The findings from this study are consistent with the results of a study by Wright, Hickson and Frost (2006) who reported that the dining room environment can increase food intake. Furthermore, it increases patients' opportunities to enjoy the social aspect of mealtimes and potentially lead to a reduced risk of malnutrition in a rehabilitation setting. The study revealed

that in hospitals that used the bulk dishing system, one of the contributing factors that negatively affected food presentation was the lack of correct serving utensils, with patients themselves serving food in some hospitals. It is worth noting that the plating system used in one of the hospitals contributed to the acceptable visual presentation of food. It also resulted in minimum food waste on patients' plates. This finding corroborates the findings of a study conducted by Navarro et al. (2016) in Beilison Hospital which revealed that patients who received a meal with improved presentation showed a significantly higher food intake than those who received a standard-looking meal, despite a reported loss of appetite.

5.7 Factors affecting hospital food provisioning

The findings from this study corroborate the finding presented by a consultant who was hired by South Africa's National Department of Health in 1994 (DoH, 2010). At the time, the challenges encountered by hospital food services nationally included: (i) unavailability of food service equipment and utensils; (ii) inadequate infrastructure, which required upgrading; (iii) a lack of relevant training for food handlers and food service management; (iv) difficulty in implementing the provincial menu, (v) supply chain and procurement challenges; (vi) inconsistent budget allocations; and (vii) non-compliance with laws and regulations.

The findings from this study are also consistent with the findings from studies on the Sri Lankan healthcare setting, where meal quality and food safety aspects of the food service units were found to be far from optimal. Additionally, the general level of cleanliness was not at an acceptable standard, the availability of physical and human resources was a challenge, and the hygiene practices of staff were below the expected standards. Furthermore, the quality and diversity of hospital meals were unsatisfactory, and none of the food-handling staff had undergone training on food safety and hygiene after their initial training post recruitment.

5.7.1 Food service budget allocation

The strategic allocation of resources in hospital food services in the public healthcare sector is essential in rendering a quality service. The budget allocation of hospital food services should be formulated in line with market-related prices of food, fuel and other costs that affect food prices and funding requirements. These food service budgets should be in line with patients' nutritional needs and be per capita-specific.

Significant differences in the four hospital budgets reviewed signalled unfair budget allocations in the hospitals. A surprising finding was that the cost per capita for the four hospitals was

inconsistent as the hospital with the lowest number of patients had the highest budget. The cost per capita for Hospital D was double the cost per capita for Hospital A, while similarities were observed between Hospitals B and C. The inadequate budget of Hospital C may have contributed to the low provision of essential nutrients, such as minerals (calcium), and vitamins and minerals from fruit. These might have been regarded as non-essential foods (luxury food items) which were avoided in the interests of cost saving but in the process the patients were exposed to the risk of malnutrition. In order for food services to provide meals that are nutritionally adequate in terms of quality and quantity (DoH, 2010), hospital management support is essential to ensure that the budget allocation for food services is adequate.

5.7.2 Inadequate infrastructure: A barrier to efficient food services

The Department of Health in other provinces, e.g. the provincial government of the Western Cape, had upgraded infrastructure in hospital services. Furthermore, their food handlers and the general food service personnel were trained in food safety, the application of the food service policy, and provincial standard operating procedures for food services and food hygiene (Goeiman et al., 2011). In this respect, the findings from this study indicate that hospital food provisioning may suffer due to a series of factors, such as inadequate infrastructure, a lack of essential office equipment and devices for the supervisor's office, the unavailability of skilled food handlers and the lack of training for the development of food service personnel.

According to Zain and Naing (2002), food-handling personnel play a significant role in ensuring food safety throughout the chain of food production and storage. In a study conducted by Kibret and Abera (2012) in Bahir Dar, it was reported that poor sanitary conditions and food hygiene practices among food handlers affected food safety. The findings of Kibret and Abera (2012) echo the findings from this study which show that the food service units across the four hospitals lacked adequate, basic hand hygiene infrastructure and therefore food safety was compromised, posing serious health risks to patients.

Among the challenges facing hospital food services in the four psychiatric hospitals were financial resources to upgrade food service equipment, including boiler plants, and general equipment, such as ovens and tilting pans, as well as storage areas. Furthermore, the operational equipment had exceeded its useful life span and needed replacing. Food handlers were faced with multi-faceted challenges in their endeavours to comply with basic food safety regulations and to prepare and produce quality meals for patients, compounded by a lack of uniforms and well-resourced ablution rooms. These findings are congruent with those of Bertin et al. (2009)

who reported that food handlers were working in unhealthy environments and were of the opinion that upper management, when deciding on resource allocations, did not prioritise human and material resources for food services and regarded food-handling jobs as being of lesser importance.

5.7.3 Recruitment and shortage of food handlers

In South Africa, particularly in the Eastern Cape, hospital food services in public healthcare generally aggregate food handlers without specific education or vocational training. Food handlers may use such work as a steppingstone or temporary employment (Da Cunha et al., 2014) or as a gateway to the government employment system or database in view of the high unemployment rate (29%) in South Africa (Statistics South Africa, 2019). The basic job entry requirement for food handlers in terms of education level, according to the Department of Health in the Eastern Cape, is Grade 10 or equivalent (ABET). This is similar to the findings of Da Cunha et al. (2014) that food services, particularly in Brazil but also in both developing countries and developed countries, did not demand a high level of education.

As the labour market in South Africa does not have a specific body that regulates hospital food services, particularly the education required (including ABET), beyond the ability of food handlers to read and write, unskilled individuals were found in this study to be recruited by hospitals to be food handlers. In the South African context, such individuals may – according to one of the key informants – opt for a food-handling job simply for the financial reward and convenience. Some of those recruited for food-handling positions lacked basic food service knowledge, having previously worked as fuel attendants. Their lack of knowledge and experience could in time affect their motivation. Motivation is a variable that is directly linked to positive food safety attitudes and acceptable food-handling practices (Da Cunha et al., 2014). However, the fact that the entry salary for a food handler of R102 534 per annum might feed a household, should not be played down.

The standard job advertisements put out to recruit food handlers and fill posts may have contributed to the poor quality of food prepared. This is conceivable given that the experience required for applicants to be shortlisted and employed as food handlers ranged from no experience to two years' experience (with a Grade 10 or equivalent ABET education). Inexperienced food handlers did not have prior food preparation experience in a large-scale food service unit. They therefore lacked the necessary production and general food service

knowledge to render an efficient and quality service. This subsequently resulted in poor food service quality.

Exacerbating the problem of inexperienced food handlers being recruited is the lack of training provided by the Department of Health in the Eastern Cape. These shortcomings lead to other problems down the line, subsequently affecting the quality of food served to patients. Surprisingly, the Department of Health in Limpopo and the Western Cape have different requirements for comparable categories of food handlers (Table 5.1). These provinces seem to have better recruitment structures in place, making the job of food handlers easier because they are better equipped to do their jobs. Inconsistency in experience requirements for entry -level posts within the Department of Health in three provinces was noted (Table 5.1). As reported by four of the key participants in the study, the four psychiatric hospitals either recruited qualified individuals to be food handlers or provided in-training to those with little or no experience in a large scale food service environment.

The zero-experience requirement for food handlers was surprising because an entry-level post of a laundry worker, which is also categorised as an entry-level post similar to that of a food service aid, porter and general worker, required Grade 10 (or ABET equivalent) with two years' laundry or cleaning experience. An entry-level 2 post for a porter required an incumbent to have Grade 10 or ABET level 4, with one year of experience in a hospital environment considered to be an added advantage. The disadvantage of having the clause 'zero experience' is that it creates a loophole to recruit people who are not skilled and experienced in food services.

The study revealed that this was one of the factors that might affect food quality and compliance with food safety regulations. In this respect, the findings of this study are consistent with those of a study by Goeiman et al., (2011) on public hospital food services which highlighted that a number of key issues surrounding the nutrition workforce in the Western Cape were related to the composition of staff, training and induction, and available skills.

Table 5.1: Comparison of required post competencies for food handlers in three provincial governments

Limpopo	Western Cape	Eastern Cape
A minimum of Grade 12 or ABET/NQF level 4; Appropriate experience in a food service unit; Ability to prepare meals according to standardised recipes and menus; Basic knowledge of food service hygiene and safety principles.	Basic literacy and numeracy; Appropriate experience in a large-scale food service unit; Knowledge of food production for normal and therapeutic diets in an industrial, large-scale food service unit; Knowledge of hygiene, occupational health, HACCP and safety principles.	*Circular Number 1 of 2019 (DoH, 2019):* ABET level 4 or NQF level 1 to 3 with no experience; Basic literacy; Knowledge of food services and food preparation, operation of food-processing equipment, basic health and safety measures, the health environment, hygiene and bacterial contamination control measures;
		Ability to operate food-processing equipment and to measure accurately. *Circular Number 5 of 2017 (DoH, 2017):* Grade 10 or ABET; Basic literacy; Knowledge of food services and food preparation, operation of food-processing equipment, basic health and safety measures, the health environment, hygiene and bacterial contamination control measures; Ability to operate food-processing equipment and measure accurately.

DoH (2019) and DoH (2017)

5.7.4 Training and development of food handlers

Training seems to be an effective tool for improving knowledge. As knowledge is fundamental to proper practices in the workplace, it is not recommended that training be abandoned. Da

Cunha et al. (2014) reported that if staff are to avoid forgetting learned content, they should undergo frequent refresher training or retraining, at least every six months to one year. According to Da Cunha et al. (2014), Santos City law stipulates that every three years, all food handlers must receive 10 hours of theoretical training for certification in good manufacturing practices in food-handling environments. Furthermore, the federal food safety law states that food handlers must be trained regularly in personal hygiene, hygienic food-handling practices and food-borne illnesses.

The dichotomy exposed in this study is that food handlers in all four hospitals had not received relevant food safety-related training in the past 10 years. This study's findings are similar to those of a study conducted in Brazil where 7.1% of food handlers from hospitals and 16.7% from public schools had never received training. According to Goeiman et al., (2011), food handlers in the provincial government of the Western Cape were trained in assistant cheffing, kitchen cleaning and standard food service operating procedures in an effort to improve the quality of food and enhance compliance with SOPs and the provincial food service policy.

In the context of this study, relevant training is training of any form that is specifically designed to meet the core responsibilities of the job. Relevant training of hospital food handlers, which is necessary to ensure that they produce microbiologically safe and nutritious meals of an acceptable quality, includes: (i) Prerequisite programmes for food safety; (ii) Introduction to HACCP; (iii) Professional cookery; (iv) Assistant cheffing; (v) Kitchen cleaning; (vi) Food service policy; and (vii) Food service standard operating procedures. According to the Department of Health (2010), HACCP training should be compulsory for all food handlers. However, this is in contrast to the findings of the study as the food handlers in the four hospitals had not been trained in HACCP or in prerequisite programmes.

From the types and frequency of training provided, it is evident that food handlers were trained in non-critical areas that did not contribute to the quality of food services. Such training included Batho Pele principles, occupational health and safety, firefighting and basic computer skills. Therefore, hospital food handlers were unable to meet the required quality standards in terms of patient food provision. The lack of critical training for food handlers might have been a contributing factor in the substandard quality of food provided, the non-compliance with food safety regulations, and the inadequate quality standards and performance-related shortcomings of the hospital food service units. While prioritising training for nurses may be justified on the

grounds that a quality healthcare service must be provided in public hospitals, neglecting food service-related training might compromise the quality of food provision and patient health.

5.7.6 Supplier performance and contract management

Various suppliers are contracted by the Department of Health on either a long- or short-term basis to provide goods and services to different institutions. In the case of food services in public hospitals, suppliers that are sourced through the central supplier database (CSD) and other provincial databases compete for government tenders. The CSD is a single, centralised database that serves as the source of all supplier information for all organs of the state (spheres of government) in South Africa. Competent suppliers are contracted to render services and provide foodstuffs to various institutions. Supplier performance has the potential to jeopardise or enhance the performance of hospital food services.

Strategies to assess the quality of products prior to awarding tenders to suppliers include conducting sample evaluations and site visits to inspect the premises of the manufacturer producing the goods and the storage facilities and capacity of the suppliers to transport/deliver the required products to the four hospitals. However, there are responsibility gaps in the area of contract management. The absence of SOPs detailing the roles of the various stakeholders, such as food service managers, with regard to contract management might cause ongoing problems which should have been addressed at the outset, such as failure to deliver on time or the delivery of items of substandard quality. It is important that there is communication between the suppliers contracted to deliver food items and the food service managers, independent of supply chain and procurement officers.

When suppliers failed to keep up, because of financial constraints, with the demands of supplying groceries to the food service units according to contractual agreements (resulting in low stock levels in the food service unit stores), some suppliers had to resort to approaching the Eastern Cape Development Cooperation (ECDC) for financial assistance. Furthermore, deviations from the provincial food service menu and repetition of food served to patients within a short period of time were the result of failure to supply orders on time. Similar food provisioning challenges were noted in other studies, e.g. in Limpopo hospitals in 2012 (www.bizcommunity.com>article) and Gauteng hospitals in 2013 (www.iol.co.za>news>politics). These were also linked to suppliers' non-delivery of food items, which affected the implementation of provincial menus and foodstuffs provided, leading to the same food being repeated and compromised patients' nutrient intake.

Contract management is the process of managing contracts that are entered into as a legal means of forging working relationships between suppliers and customers (end users). The intention is to meet the operational, functional and business objectives required by the contract and ensure a profitable interaction. The contract management framework (CMF) of South Africa's National Treasury (2010) asserts that in the event of a breach of contract by the supplier to render services or provide goods as per the contractual agreement, the end user has the authority to institute a complaints process (Bizana, Naude & Ambe, 2015). Irregular expenditure was identified in one hospital where two contracts were found to still be active six months after the one contract had evidently ended for the dairy products, and so a delivery of foodstuffs was received simultaneously from both suppliers. The positive aspect of the hospital having two contracts was that when one supplier failed to deliver, the other one was able to deliver the required food items. However, according to supply chain regulations, having two active contracts and receiving the same commodity under both contracts was regarded as irregular expenditure.

5.7.6 Compliance with policies and regulations

The findings from this study show that there has been only a pocket-size investment in upscaling hospital food services through the upgrading of infrastructure and training of food handlers. The Policy for Food Service Management in Public Health Establishments (2010) states that the aim of the Skills Development Act of 1998 is to improve the working skills of all South Africans at all levels through training. The policy further states that the development and upskilling of food handlers should be in line with the Skills Development Act, the South African Qualifications Authority (SAQA) and the National Skills Development Strategy.

However, in the Eastern Cape, compliance with the training requirement for food handlers has not been prioritised as no critical training has been provided to food handlers in the four psychiatric hospitals over the past 10 years. The skills of all food service personnel should be prioritised and developed with the aim of improving food service performance and quality in health establishments.

As a consequence of the sub-standard quality of infrastructure and the lack of sufficient resources, compliance with Regulation R638 of the Foodstuffs, Cosmetics and Disinfectants Act of 1972 is at a very low level. Although hospitals are perceived to be places with vast resources (Furman, 2013), the resources in the four hospitals are in fact inadequate. The Department of Health in the Eastern Cape has not enforced compliance with Regulation R638

as none of the four hospitals was in possession of a certificate of acceptability (COA) at the time of the study. Food service units had not received a COA from an environmental health officer since 1994.

The four participating hospitals were not licensed to prepare meals for patients, which is similar to the findings of Kibret and Abera (2012) who reported that some food establishments in Bahir Dar were unlicensed. The Western Cape Department of Health developed and implemented the food service scoring scale in its public hospitals (Table 5.2) to rate compliance with food service standards and measure food service performance.

Table 5.2: Food service audit scoring scale (Western Cape Government: Health, 2011)

Grading	Colour coding	Description	Explanation
90%–100%	Gold	Excellent	Exceeds compliance/a leader in the field
75%–89%	Silver	Very good	Full compliance with the food service management policy
60%–74%	Bronze	Good	Mostly compliant
50%–59%	Red	Unacceptable	Little compliance
<49%	Black	High risk	No or poor compliance

5.8 Effects of training on organisational performance

Relevant training, for the purpose of this study, is training of any form that is designed to specifically meet the core responsibilities of the job. Relevant training for hospital food handlers, which is necessary to ensure the production by food handlers of microbiologically safe and nutritious meals of an acceptable quality, include (i) Prerequisite programmes for food safety; (ii) Introduction to HACCP; (iii) Professional cookery; (iv) Assistant cheffing; (v) Kitchen cleaning; (vi) Food service policy; and (vii) Food service standard operating procedures.

Contrary to the perception that working for government would bring about growth and development in one's career path, the experience of the food handlers in the provincial Department of Health in the four psychiatric hospitals pointed to the opposite being true. As some studies showed that theoretical knowledge had little effect on trained food handlers, more on-the-job training and hands-on training materials should be developed (Park, Kwak & Chang, 2010).

5.9 Nurses' perceptions of the nutritional needs of psychiatric patients

The existence of hospital malnutrition is known and documented, and psychiatric patients are known to be particularly at risk of malnutrition, yet physical examinations and nutrition assessments are rarely conducted in public psychiatric hospitals. This suggests that malnutrition is not considered to be of significance (Abayomi & Hackett, 2004). Nurses who participated in this study reported that they lacked the necessary equipment to conduct nutrition screening and assessments in order to detect malnutrition in newly admitted patients and existing patients across the psychiatric hospitals. Nurses struggled to identify patients with malnutrition. Management support for the provision of essential tools to monitor malnutrition in newly admitted patients may be a valuable, long-term investment of government funds. More than 90% of in-patients experienced protein-energy malnutrition and weight loss, with the root causes being poor monitoring of nutritional status, inadequate nutrient intake prior to and following admission, and the prevalence of diseases (Kim, Kim & Lee, 2010). Providing nutrition-related education for nursing staff might help to improve their knowledge and awareness of malnutrition in psychiatric patients.

5.10 Conclusion

This study assessed factors affecting food provisioning in public psychiatric hospitals in the Eastern Cape. The provision of nutrients that did not meet the daily requirements of patients included calcium, vitamin C and vitamin A, while carbohydrates and fats were provided in significantly higher quantities than patients' requirements. Among the challenges that affected food services were inconsistent budget allocations, inadequate infrastructure, and shortcomings in the recruitment and training of staff and in the procurement of food. A positive correlation was revealed between training and compliance with regulations, indicating that the training of food handlers must be prioritised by the Eastern Cape Department of Health in order to upscale hospital food services, improve the quality of food and make food service performance more efficient.

5.11 Limitations of the study

Several challenges were encountered during the study and these are summarised below.

Accessing documents pertinent to the research was difficult. In addition, some people from the nursing component were unwilling to participate in the study because they feared losing their jobs or being victimised for taking part in the study, resulting in a smaller-than-expected sample

size for this study. Furthermore, people from food services were reluctant to participate in the survey at first as they feared that the researcher was conducting investigations on behalf of a media house or was a representative of the national or provincial Department of Health. However, after they were provided with thorough explanations of the aim and objectives of the study, they eventually cooperated.

Because of the small size and localised nature of the hospitals, the findings from this study cannot be generalised to represent all public hospitals in South Africa. Finally, the scope of this study did not allow an in-depth exploration of all aspects of food services in psychiatric hospitals; however, it did illustrate several challenges. Future studies are therefore warranted.

5.12 Recommendations

The Department of Health in the Eastern Cape needs to specify a provincial menu that is culturally acceptable and develop a provincial food service policy in which food service personnel would be trained with the aim to ensuring compliance with the provincial menu and an efficient food service. The Department of Health should also review its budgets for all hospitals to ensure fair budget allocations that provide for the daily nutrient requirements of patients and prevent malnutrition. The Department needs to provide dietetic support services to patients on an ongoing process in the four psychiatric hospitals. Dietetic services are justified for the purposes of food provisioning and providing support to food service managers in the interests of effective patient nutrition care.

The Department also needs to invest in food service personnel by providing relevant training (HACCP, assistant cheffing, professional cookery, kitchen cleaning, etc.) to improve the overall performance of food services, enhance compliance with regulations, and improve the knowledge and morale of staff. Institutional management, in turn, should support hospital food services by upgrading old food service equipment and standardising the allocation of food handlers and food service supervisors in line with the number of patients catered for. This will help to ensure compliance with food safety and the timing of meals.

A monitoring tool should be designed and introduced to monitor and evaluate compliance with the national and provincial food service policy and with the overall performance of food services. The Department of Health needs to prioritise food safety by reinforcing compliance with Regulation R368 and insisting on licenced food service establishments. Institutional management needs to establish a structure that would ensure food safety compliance at ward

level by conducting random food audits. The Department of Health needs to re-evaluate the inherent job requirements of the food service aid in the advertisements used to recruit food handlers, with a view to ensuring that skilled and knowledgeable food handlers enter the system.

The Department of Health also needs to have stringent measures in place in relation to contract management at institutional and district level. An SOP needs to be formulated to provide clear guidelines on when order numbers must be closed once a new contract is awarded, to avoid irregular expenditure. Also needed is investment in the training of food service managers in basic supply chain regulations and procurement in order to increase accountability for patient food procurement.

5.13 Suggestions for further research

More in-depth studies as well as longitudinal studies in psychiatric hospitals in the Eastern Cape and other provinces are necessary. It is also desirable for a comparative study to be conducted on the root causes of the slow upgrading of food services to meet the necessary quality standards in the Eastern Cape's general public hospitals and public psychiatric hospitals.

REFERENCES

Abayomi, J. & Hackett, A. (2004). Assessment of malnutrition in mental health clients: Nurses' judgement vs. a nutrition risk tool. *Journal of advanced nursing*, *45*(4), pp. 430-437.

Ahmedani, B.K. (2011). Mental health stigma: Society, individuals, and the profession. *Journal of social work values and ethics*, *8*(2), pp. 4–1.

Alonso, E.B. (2015). *The impact of culture, religion and traditional knowledge on food and nutrition security in developing countries* (No. 2201-2019-1458), pp.1-81.

Alvi, M. (2016). A manual for selecting sampling techniques in research, pp. 1-57.

Bain, L.E., Awah, P.K., Geraldine, N., Kindong, N.P., Siga, Y., Bernard, N. & Tanjeko, A.T. (2013). Malnutrition in Sub–Saharan Africa: Burden, causes and prospects. *Pan African Medical Journal*, *15*(1), pp. 1-9.

Barrie, D. (1996). The provision of food and catering services in hospital. *Journal of Hospital Infection*, *33*(1), pp. 13–33.

Bateman, C. (2015). Mental health under-budgeting undermining SA's economy. *SAMJ: South African Medical Journal*, *105*(1), pp. 7–8.

Beck, A.M., Balkn, U.N., Fürst, P., Hasunen, K., Jones, L., Keller, U., Melchior, J.C., Mikkelsen, B.E., Schauder, P., Sivonen, L. & Zinck, O. (2001). Food and nutritional care in hospitals: How to prevent undernutrition–report and guidelines from the Council of Europe. *Clinical Nutrition*, *20*(5), pp. 455–460.

Benn, J. (2014). Food, nutrition or cooking literacy-a review of concepts and competencies regarding food education. *International Journal of Home Economics*, *7*(1), p.13.

Benton, D. (2008). Micronutrient status, cognition and behavioral problems in childhood. *European journal of nutrition*, *47*(3), pp.38-50.

Bertin, C.H.F.P., Rezende, M.A., Sigulem, D.M. & Morais, T.B. (2009). Hurdles at work: Perceptions of hospital food handlers. *Human resources for health*, *7*(1), p. 63.

Bibbins-Domingo, K., Grossman, D.C., Curry, S.J., Davidson, K.W., Epling, J.W., García, F.A., Kemper, A.R., Krist, A.H., Kurth, A.E., Landefeld, C.S. & Mangione, C.M. (2017). Folic acid supplementation for the prevention of neural tube defects: US Preventive Services Task Force recommendation statement. *Jama*, *317*(2), pp. 183–189.

Birdi, K.S. (2005). No idea? Evaluating the effectiveness of creativity training. *Journal of European Industrial Training*, *29*(2), pp. 102–111.

Bizcommunity.com. (2012). Limpopo hospital food supplies to be addressed. **https://www.bizcommunity.com>article**

Bizana, N., Naude, M.J. & Ambe, I.M. (2015). Supply chain management as a contributing factor to local government service delivery in South Africa. *Journal of Contemporary Management*, *12*(1), pp.664-683.

Blandford, A.E. (2013). Semi-structured qualitative studies. Interaction Design Foundation, pp.1-53.

Bolton, P. (2006). Government procurement as a policy tool in South Africa. *Journal of public procurement*, *6*(3), pp. 193–217.

Brumberg, H.L. & Shah, S.I. (2015). Born early and born poor: An eco-bio-developmental model for poverty and preterm birth. *Journal of Neonatal-Perinatal Medicine*, *8*(3), pp. 179–187.

Casagrande, S.S., Dalcin, A., McCarron, P., Appel, L.J., Gayles, D., Hayes, J. & Daumit, G. (2011). A nutritional intervention to reduce the calorie content of meals served at psychiatric rehabilitation programs. *Community mental health journal*, *47*(6), pp. 711–715.

Castillo-Martínez, L., Castro-Eguiluz, D., Copca-Mendoza, E.T., Pérez-Camargo, D.A., Reyes-Torres, C.A., Alejandra-Damasco Ávila, E., López-Córdova, G., Fuentes-Hernández, M.R., Cetina-Pérez, L. & Milke-García, M.D.P. (2018). Nutritional assessment tools for the identification of malnutrition and nutritional risk associated with cancer treatment. *Revista de Investigación Clínica*, *70*(3), pp. 121–125.

Cereda, E., Pedrolli, C., Zagami, A., Vanotti, A., Piffer, S., Faliva, M., Rondanelli, M. & Caccialanza, R. (2013). Nutritional risk, functional status and mortality in newly institutionalised elderly. *British Journal of Nutrition*, *110*(10), pp. 1903–1909.

Chamblee, T.B., Smith, S., Shuster, M.H. & Haight, K. (2017). Looking Beyond the First Impression: Malnutrition in the Hospital Setting. *Clinical Nurse Specialist*, *31*(5), pp. 235–236.

Chiaburu, D.S., Van Dam, K. & Hutchins, H.M. (2010). Social support in the workplace and training transfer: A longitudinal analysis. *International Journal of Selection and Assessment*, *18*(2), pp. 187–200.

Chilton, M. & Booth, S. (2007). Hunger of the body and hunger of the mind: African American women's perceptions of food insecurity, health and violence. *Journal of nutrition education and behavior*, *39*(3), pp. 116–125.

Corrigan, P. (2004). How stigma interferes with mental health care. *American psychologist*, *59*(7), p. 614.

Corrigan, P.W., Druss, B.G. & Perlick, D.A. (2014). The impact of mental illness stigma on seeking and participating in mental health care. *Psychological Science in the Public Interest*, *15*(2), pp. 37–70.

Creswell, J.W., Klassen, A.C., Plano Clark, V.L. & Smith, K.C. (2011). Best practices for mixed methods research in the health sciences. *Bethesda (Maryland): National Institutes of Health*, *2013*, pp. 541–545.

da Cunha, D.T., Stedefeldt, E. & de Rosso, V.V. (2014). The role of theoretical food safety training on Brazilian food handlers' knowledge, attitude and practice. *Food Control, 43*, pp.167-174.

Dall'Oglio, I., Nicolò, R., Di Ciommo, V., Bianchi, N., Ciliento, G., Gawronski, O., Pomponi, M., Roberti, M., Tiozzo, E. & Raponi, M. (2015). A systematic review of hospital foodservice patient satisfaction studies. *Journal of the Academy of Nutrition and Dietetics, 115*(4), pp. 567–584.

Daniels, I. (2018). An investigation into mental health care deficits in South Africa: exploring an alternative intervention strategy (Doctoral dissertation, University of Cape Town).

Daumit, G.L., Dickerson, F.B., Wang, N.Y., Dalcin, A., Jerome, G.J., Anderson, C.A., Young, D.R., Frick, K.D., Yu, A., Gennusa III, J.V. & Oefinger, M. (2013). A behavioral weight-loss intervention in persons with serious mental illness. *New England Journal of Medicine, 368*(17), pp. 1594–1602.

Department of Health (DoH). (2010). Policy for the Food Service Management in Public Health Establishments. *Applied Nursing Research, 19*, pp. 38–42.

Department of Health. (2019). Circular Number 1 of 2019.

Department of Health. (2017). Circular Number 5 of 2017.

DiCicco-Bloom, B. & Crabtree, B.F. (2006). The qualitative research interview. *Medical education, 40*(4), pp. 314–321.

Dlova, Z.N. (2018). An investigation on food safety of the National School Nutrition Programme in Peddie, Eastern Cape, South Africa.

Du Plessis, L.M., Naude, C.E. & Swart, R. (2016). Nutrition during the first thousand days of life. *Community Nutrition for Developing Countries, 65*.

Eastern Cape Socio Economic Consultative Council. (2017). Raymond Mhlaba Local Municipality. Socio Economic Review and Outlook. Available at: **https://www.ecsecc.org/documentrepository/informationcentre/raymond-local-municipality_12336.pdf**

Edwards, J.S.A. & Hartwell, H.J. (2004). A comparison of energy intake between eating positions in a NHS hospital – A pilot study. *Appetite*, *43*(3), pp. 323–325.

Edwards, J.S.A. and Hartwell, H.J., 2006. Hospital food service: a comparative analysis of systems and introducing the 'Steamplicity'concept. *Journal of human nutrition and dietetics*, *19*(6), pp.421-430.

Edwards, S., Makunga, N., Thwala, J. & Mbele, B. (2009). The role of the ancestors in healing: indigenous African healing practices. *Indilinga African Journal of Indigenous Knowledge Systems*, *8*(1), pp.1-11.

Elmslie, J.L., Mann, J.I., Silverstone, J.T., Williams, S.M. & Romans, S.E. (2001). Determinants of overweight and obesity in patients with bipolar disorder. *The Journal of clinical psychiatry*, *62*(6), pp. 486–491.

Engetou, E. (2017). The Impact of Training and Development on Organizational Performance.

Erasmus, M. & Kean, H. (2018). Private hospital expenditure and relation to utilisation: Observations from the data. *South African Journal of Economic and Management Sciences*, *21*(1), pp. 1–14.

Eskildsen, S.F., Coupé, P., Fonov, V., Manjón, J.V., Leung, K.K., Guizard, N., Wassef, S.N., Østergaard, L.R., Collins, D.L. & Alzheimer's Disease Neuroimaging Initiative (2012). BEaST: brain extraction based on nonlocal segmentation technique. *NeuroImage*, *59*(3), pp. 2362–2373.

Fernando, G.H.S. and Wijesinghe, C.J., 2017. Quality and standards of hospital food service; a critical analysis and suggestions for improvements. *Galle Medical Journal*, *22*(2).

Furman, E. (2013). The theory of compromised eating behavior. *Research in gerontological nursing*, *7*(2), pp. 78–86.

Goeiman, H., Labadarios, D. & Steyn, N.P. (2011). Who is the nutrition workforce in the Western Cape? *South African Journal of Clinical Nutrition*, *24*(2).

Gould, J.F., Smithers, L.G. & Makrides, M. (2013). The effect of maternal omega-3 (n-3) LCPUFA supplementation during pregnancy on early childhood cognitive and visual development: A systematic review and meta-analysis of randomized controlled trials. *The American journal of clinical nutrition*, *97*(3), pp. 531–544

Grunert, K.G., 2005. Food quality and safety: consumer perception and demand. *European review of agricultural economics*, *32*(3), pp.369-391.

Hakel-Smith, N., Lewis, N.M. & Eskridge, K.M. (2005). Orientation to nutrition care process standards improves nutrition care documentation by nutrition practitioners. *Journal of the American Dietetic Association*, *105*(10), pp. 1582–1589.

Halcrow, S.E., Harris, N.J., Beavan, N. & Buckley, H.R. (2014). First bioarchaeological evidence of probable scurvy in Southeast Asia: Multifactorial etiologies of vitamin C deficiency in a tropical environment. *International Journal of Paleopathology*, *5*, pp.63-71.

Harris, C.L. & Fraser, C. (2004). Institutionalized elderly: The effects on wound healing. *Ostomy/wound management*, *50*(10), pp. 54–63.

Hellemans, K.G., Sliwowska, J.H., Verma, P. & Weinberg, J. (2010). Prenatal alcohol exposure: Fetal programming and later life vulnerability to stress, depression and anxiety disorders. *Neuroscience & Biobehavioral Reviews*, *34*(6), pp. 791–807.

Hongoro, C. & McPake, B. (2004). How to bridge the gap in human resources for health. *The Lancet*, *364*(9443), pp. 1451–1456.

IOL News. (2013). Food Shortages in Gauteng hospitals.

https://www.iol.co.za>news>politics

Jensen, S.K., Berens, A.E. & Nelson III, C.A. (2017). Effects of poverty on interacting biological systems underlying child development. *The Lancet Child & Adolescent Health*, *1*(3), pp. 225–239.

Jiyana, M.J., Ncube, L.J. & Nesamvuni, A.E. (2018). Nutrient composition of planned adult patients' normal diet menus in selected public hospitals in Gauteng Province, South Africa. *African Journal for Physical Activity and Health Sciences (AJPHES)*, *24*(3), pp. 245–261.

Kallivayalil, R.A. (2012). The importance of psychiatry in undergraduate medical education in India. *Indian journal of psychiatry*, *54*(3), p. 208.

Karban, K. (2016). Developing a health inequalities approach for mental health social work. *British Journal of Social Work*, *47*(3), pp. 885–992.

Kaston, T.V. (2018). *Investigating the impact of formal education and training on employee performance in the coal mining industry* (Doctoral dissertation, North-West University).

Kawulich, B.B. (2005). May. Participant observation as a data collection method. In *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research* (Vol. 6, No. 2).

Kennedy, P.E., Chyung, S.Y., Winiecki, D.J. & Brinkerhoff, R.O. (2014). Training professionals' usage and understanding of K irkpatrick's Level 3 and Level 4 evaluations. *International Journal of Training and Development*, *18*(1), pp.1-21.

Khan, R.A.G., Khan, F.A. & Khan, M.A. (2011). Impact of training and development on organizational performance. *Global Journal of Management and Business Research*, *11*(7).

Kibe, E.N. & Wanjau, K. (2014). The effect of quality management systems on the performance of food processing firms in Kenya. *IOSR Journal of Business and Management*, *16*(5), pp. 61–72.

Kibret, M. & Abera, B. (2012). The sanitary conditions of food service establishments and food safety knowledge and practices of food handlers in Bahir Dar town. *Ethiopian journal of health sciences*, *22*(1), pp. 27–35.

Kim, K., Kim, M. & Lee, K.E. (2010). Assessment of foodservice quality and identification of improvement strategies using hospital foodservice quality model. *Nutrition research and practice*, *4*(2), pp.163-172.

Knight, A. (2018). Mediterranean Diet as a Potential Strategy to Reduce Cognitive Decline and Dementia in Elderly. In *Role of the Mediterranean Diet in the Brain and Neurodegenerative Diseases*, pp. 183–207. Academic Press.

Lacey, K. and Pritchett, E. (2003). Nutrition care process and model: ADA adopts road map to quality care and outcomes management. *Journal of the Academy of Nutrition and Dietetics*, *103*(8), pp.1061-1072.

Licombe, L.C. (2018). *Examining the Impact of Training and Development on Employees Performance in Public Sector: A Case of Tanzania Telecommunication Company Limited (TTCL)* (Doctoral dissertation, The Open University of Tanzania).

Lund, C. (2012). Poverty and mental health: A review of practice and policies. *Neuropsychiatry*, *2*(3), pp. 213–219.

Mattejat, F. & Remschmidt, H. (2008). The children of mentally ill parents. *Deutsches Ärzteblatt International*, *105*(23), p. 413.

Mbanga, N.I., Niehaus, D.J.H., Mzamo, N.C., Wessels, C.J., Allen, A., Emsley, R.A. & Stein, D.J. (2002). Attitudes towards and beliefs about schizophrenia in Xhosa families with affected probands.

McCarthy, H., Dixon, M., Crabtree, I., Eaton-Evans, M.J. & McNulty, H. (2012). The development and evaluation of the Screening Tool for the Assessment of Malnutrition in Paediatrics (STAMP©) for use by healthcare staff. *Journal of Human Nutrition and Dietetics*, *25*(4), pp. 311–318.

McEwen, B.S. (2012). Brain on stress: How the social environment gets under the skin. *Proceedings of the National Academy of Sciences*, *109*(Supplement 2), pp.17180-17185.

McGarel, C., Pentieva, K., Strain, J.J. and McNulty, H. (2015). Emerging roles for folate and related B-vitamins in brain health across the lifecycle. *Proceedings of the Nutrition Society*, *74*(1), pp.46-55.

Merieux Nutrisciences, (2018). Food safety management system. ISO 22000.

Minde, M. (1976). History of Mental Health Services in South Africa. Part XIV Psychiatric Education. South African Mediese Tydskrif. Available at: **https://journals.co.za/docserver/fulltext/m_samj/51/7/24323.pdf?expires=1558944686&id=id&accname=guest&checksum=2F46360CAA141AC46F9BA9B886C90B6C**

Mitchell, P.H., Ferketich, S., Jennings, B.M. and American Academy of Nursing Expert Panel on Quality Health Care, (1998). Quality health outcomes model. *Image: The Journal of Nursing Scholarship*, *30*(1), pp.43-46.

Mohajan, H.K. (2017). Two criteria for good measurements in research: Validity and reliability. *Annals of Spiru Haret University. Economic Series*, *17*(4), pp. 59–82.

Monteiro, N.M. (2015). Addressing mental illness in Africa: Global health challenges and local opportunities. *Community Psychology in Global Perspective*, *1*(2), pp. 78–95.

Motulsky, A.G. (1992). Nutrition and genetic susceptibility to common diseases. *The American journal of clinical nutrition*, *55*(6), pp. 1244S–1245S.

Moussa, H.N., Hosseini Nasab, S., Haidar, Z.A., Blackwell, S.C. & Sibai, B.M. (2016). Folic acid supplementation: What is new? Fetal, obstetric, long-term benefits and risks. *Future science OA*, *2*(2).

Mueller, C., Compher, C., Ellen, D.M. & American Society for Parenteral and Enteral Nutrition (ASPEN) Board of Directors (2011). ASPEN clinical guidelines: Nutrition screening, assessment, and intervention in adults. *Journal of Parenteral and Enteral Nutrition*, *35*(1), pp. 16–24.

Murali, V. & Oyebode, F. (2004). Poverty, social inequality and mental health. *Advances in psychiatric treatment*, *10*(3), pp.216-224.

Musanzikwa, M. (2013). Public procurement system challenges in developing countries: The case of Zimbabwe. *International Journal of Economics, Finance and Management Sciences*, *1*(2), pp. 119–127.

Musyoka, S.T., Ochieng, I. & Nzioki, P.M. (2016). Factors affecting provision of quality service in the public health sector: A case of Nyahururu district hospital, Kenya. *International Journal of Management and Economics Invention*, *2*(9), pp. 852–896.

Nabeshima, T. & Kim, H.C. (2013). Involvement of genetic and environmental factors in the onset of depression. *Experimental neurobiology*, *22*(4), pp. 235–243.

Navarro, D.A., Boaz, M., Krause, I., Elis, A., Chernov, K., Giabra, M., Levy, M., Giboreau, A., Kosak, S., Mouhieddine, M. & Singer, P. (2016). Improved meal presentation increases food intake and decreases readmission rate in hospitalized patients. *Clinical nutrition*, *35*(5), pp. 1153–1158.

Niehaus, D.J.H., Oosthuizen, P., Lochner, C., Emsley, R.A., Jordaan, E., Mbanga, N.I., Keyter, N., Laurent, C., Deleuze, J.F. & Stein, D.J. (2004). A culture-bound syndrome ‘amafufunyana’and a culture-specific event ‘ukuthwasa’: Differentiated by a family history of schizophrenia and other psychiatric disorders. *Psychopathology*, *37*(2), pp. 59–63.

Olatawura, M.O. (1978). Mental health services for children in the African region. *International Journal of Mental Health*, *7*(1–2), pp. 34–38.

Opie, R.S., Itsiopoulos, C., Parletta, N., Sanchez-Villegas, A., Akbaraly, T.N., Ruusunen, A. & Jacka, F.N. (2017). Dietary recommendations for the prevention of depression. *Nutritional neuroscience*, *20*(3), pp. 161–171.

Otten, J., Pitzi Hellwig, J. & Meyers, L.D. (2006). *Dietary Reference Intakes: The Essential Guide to Nutrient Requirements*. [Online]. National Academies Press. [Online]. Available at: https://www.nap.edu/11537

Palinkas, L.A., Horwitz, S.M., Green, C.A., Wisdom, J.P., Duan, N. & Hoagwood, K. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Administration and policy in mental health and mental health services research*, *42*(5), pp. 533–544.

Panacek, E.A. (2008). Survey-based research: General principles. *Air medical journal*, *27*(1), pp.14-16.

Park, S.H., Kwak, T.K. & Chang, H.J. (2010). Evaluation of the food safety training for food handlers in restaurant operations. *Nutrition research and practice*, *4*(1), pp. 58–68.

Priebe, S., Matanov, A., Barros, H., Canavan, R., Gabor, E., Greacen, T., Holcnerová, P., Kluge, U., Nicaise, P., Moskalewicz, J. & Díaz-Olalla, J.M. (2012). Mental health-care provision for marginalized groups across Europe: Findings from the PROMO study. *The European Journal of Public Health*, *23*(1), pp. 97–103.

Quinn, D.M. & Earnshaw, V.A. (2013). Concealable stigmatized identities and psychological well-being. *Social and personality psychology compass*, *7*(1), pp.40-51.

Raju, M.S.V.K. (2017). Medical nutrition in mental health and disorders. *Indian journal of psychiatry*, *59*(2), p. 143.

Rahmani, J., Milajerdi, A. & Dorosty-Motlagh, A. (2018). Association of the Alternative Healthy Eating Index (AHEI-2010) with depression, stress and anxiety among Iranian military personnel. *Journal of the Royal Army Medical Corps*, *164*(2), pp.87-91.

Rashad, I., Grossman, M. & Chou, S.Y. (2005). *The super size of America: An economic estimation of body mass index and obesity in adults* (No. w11584). National Bureau of Economic Research.

Sareen, J., Cox, B.J., Stein, M.B., Afifi, T.O., Fleet, C. & Asmundson, G.J. (2007). Physical and mental comorbidity, disability, and suicidal behavior associated with posttraumatic stress disorder in a large community sample. *Psychosomatic medicine*, *69*(3), pp. 242–248.

Schulze, B. & Angermeyer, M.C. (2003). Subjective experiences of stigma. A focus group study of schizophrenic patients, their relatives and mental health professionals. *Social science & medicine*, *56*(2), pp. 299–312.

Semrau, M., Evans-Lacko, S., Koschorke, M., Ashenafi, L. & Thornicroft, G. (2015). Stigma and discrimination related to mental illness in low- and middle-income countries. *Epidemiology and psychiatric sciences*, *24*(5), pp. 382–394.

Solomon, J.A., Zukier, Z. &d Hamadeh, M.J. (2010). The Role of Nutrition in Mental Health: Depression. *Nutrition and Depression*.

Sorsdahl, K.R., Flisher, A.J., Wilson, Z. & Stein, D.J. (2010). Explanatory models of mental disorders and treatment practices among traditional healers in Mpumulanga, South Africa. *African Journal of Psychiatry*, *13*(4).

South African Constitution. (1996).

South African Medical Research Council. (2019). South African Food Composition Database (SAFOODS).

Spence, C. (2017). Hospital food. *Flavour*, *6*(1), p. 3.

Stanga, Z., Zurflüh, Y., Roselli, M., Sterchi, A.B., Tanner, B. and Knecht, G., 2003. Hospital food: a survey of patients' perceptions. *Clinical nutrition*, *22*(3), pp.241-246.

Statistics South Africa. (2019). Unemployment rate. Available at: **http://www.statssa.gov.za/?s=unemployment+rate&sitem=content** [Accessed 15 November 2019].

Sukeri, K. & Emsley, R. (2014). Lessons from the past: Historical perspectives of mental health in the Eastern Cape. *South African Journal of Psychiatry*, *20*(2), pp. 34–39.

Swart, R., Sanders, D. & McLachlan, M. (2008). Nutrition: A primary health care perspective: Primary health care: programme areas. *South African health review*, *2008*(1), pp. 129–147.

Swartz, S. (1996). *Colonialism and the production of psychiatric knowledge in the Cape, 1891-1920* (Doctoral dissertation, University of Cape Town).

Symonds, J.E. & Gorard, S. (2008). September. The death of mixed methods: Research labels and their casualties. In *British Educational Research Association Annual Conference*.

Teasdale, S.B., Ward, P.B., Rosenbaum, S., Samaras, K. & Stubbs, B. (2017). Solving a weighty problem: Systematic review and meta-analysis of nutrition interventions in severe mental illness. *The British Journal of Psychiatry*, *210*(2), pp. 110–118.

Theron, P.M. (2015). Coding and data analysis during qualitative empirical research in Practical Theology. *In die Skriflig*, *49*(3), pp. 1–9.

Van Tonder, E., Gardner, L., Cressey, S., Tydeman-Edwards, R. & Gerber, K. (2019). Adult malnutrition: Prevalence and use of nutrition-related quality indicators in South African public-sector hospitals. *South African Journal of Clinical Nutrition*, *32*(1), pp. 1–7.

Vergunst, R. (2018). From global-to-local: Rural mental health in South Africa. *Global health action*, *11*(1), p. 1413916.

Vigo, D., Thornicroft, G. & Atun, R. (2016). Estimating the true global burden of mental illness. *The Lancet Psychiatry*, *3*(2), pp. 171–178.

Walker, E., Pritchard, C. & Forsythe, S. (2003). Food handlers' hygiene knowledge in small food businesses. *Food Control*, *14*(5), pp. 339–343.

Weinreb, L., Wehler, C., Perloff, J., Scott, R., Hosmer, D., Sagor, L. & Gundersen, C. (2002). Hunger: Its impact on children's health and mental health. *Pediatrics*, *110*(4), pp. e41–e41.

Welsh, J.A., Sharma, A., Abramson, J.L., Vaccarino, V., Gillespie, C. and Vos, M.B., 2010. Caloric sweetener consumption and dyslipidemia among US adults. *Jama*, *303*(15), pp.1490-1497.

Wenhold, F. & Faber, M. (2008). *Nutritional status of South Africans: Links to agriculture and water*. Pretoria: Water Research Commission.

Western Cape Government: Provincial Department of health. (2011). Food service standard operating procedures.

Wickham, S., Whitehead, M., Taylor-Robinson, D. & Barr, B. (2017). The effect of a transition into poverty on child and maternal mental health: A longitudinal analysis of the UK Millennium Cohort Study. *The Lancet Public Health*, *2*(3), pp. e141–e148.

Williams, P. & Walton, K. (2011). Plate waste in hospitals and strategies for change. *e-SPEN, the European e-Journal of Clinical Nutrition and Metabolism*, *6*(6), pp. e235–e241.

World Health Organization. (2019). *Global status report on alcohol and health 2018*. World Health Organization.

World Health Organization, (2016). *World health statistics: Monitoring health for the SDGs sustainable development goals*. World Health Organization.

Wright, L., Hickson, M. & Frost, G. (2006). Eating together is important: Using a dining room in an acute elderly medical ward increases energy intake. *Journal of human nutrition and dietetics*, *19*(1), pp. 23–26.

Yoon, P.W., Scheuner, M.T., Peterson-Oehlke, K.L., Gwinn, M., Faucett, A. & Khoury, M.J. (2002). Can family history be used as a tool for public health and preventive medicine? *Genetics in Medicine*, *4*(4), p. 304.

Zain, M.M. & Naing, N.N. (2002). Sociodemographic characteristics of food handlers and their knowledge, attitude and practice towards food sanitation: A preliminary report. *Southeast Asian journal of tropical medicine and public health*, *33*(2), pp. 410–417.

Zimba, Z. & Tanga, P.T. (2014). Challenges faced by traditional healers when treating people living with HIV and AIDS: The case of intsika municipality, Eastern Cape Province of South Africa. *Studies on Ethno-Medicine*, *8*(3), pp. 269–327.

APPENDICES

APPENDIX 1: RESEARCH PROPOSAL

UNIVERSITY OF THE WESTERN CAPE

Faculty of Community and Health Sciences

An assessment of the nutritional adequacy and quality of food provided to adult psychiatric patients in public psychiatric hospitals in the Eastern Cape

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MSc Nutrition (full thesis) proposal

Department of Dietetics and Nutrition

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KEY WORDS

Adequate nutrition

Food quality

Patient food acceptability

Malnutrition

Mental illness

Perceptions

ACRONYMS AND ABBREVIATION

BMI	Body Mass Index
DOH	Department of Health
FSA	Food Service Aid
FSS	Food Service Supervisor
FSM	Food Service Manager
HACCP	Hazard Analysis Critical Control Points
HCUP	Health Centre Care Cost and Utilization Project
ISO	International Organization for Standardization
KAPs	Knowledge, Attitude, Practices
MUAC	Mid Upper Arm Circumference
NACNS	National Association of Clinical Nurse Specialists
NDOH	National Department of Health
PRP	Prerequisite programme
SAFMH	South African Federation of Mental Health
SES	Socio-Economic Status
WHO	World Health Organization

ABSTRACT

Introduction: The Department of Health, through its hospital food service units in public hospitals, strives to ensure the provision of nutritionally adequate meals that are acceptable in quality and quantity to in-patients as a means of achieving optimum health. Food provision plays a prominent role in the well-being and health of a patient during hospitalisation. Low food intake by patients may be influenced by a variety of factors, such as quality, presentation as well as taste, and may result in health risks such as iatrogenic malnutrition, especially during long-term hospitalisation as is common with patients in psychiatric hospitals. In addition, there is a relationship between nutrition and mental health. Food-waste audits are used in many hospital settings to determine food acceptability.

Aim: The primary aim of the study is to assess the nutritional adequacy and quality of food provided to adult psychiatric patients in public psychiatric hospitals in the Eastern Cape.

Methodology: The study will follow a quantitative approach and will make use of a descriptive cross-sectional research design. The primary component of the study will be a bulk plate-waste study to determine in-patient food intake and assess the nutritional adequacy of the foods served to patients in four public psychiatric hospitals in the Eastern Cape. The research will be conducted over five consecutive weekdays per hospital, with three consecutive days in each hospital being used to conduct a plate-waste study for all meals provided to patients to determine food waste and food acceptability, in two randomly selected wards per hospital. Subsequently, the nutritional adequacy of the food served to patients over the three days will be determined using Food Finder 3 software. The secondary component of the study will be an audit of the various aspects of food service in each of the four psychiatric hospitals and will include a brief exploration of the knowledge, attitude and practices (KAP) of food service personnel in terms of food handling as well as the perceptions of the nurses working at ward level and other identified key informants of the nutritional needs of psychiatric patients. The audit will be completed through observations and document reviews. Where necessary, further information for the audit may be sourced from key informants in the food service system (including supply chain, procurement, preparation and serving). Key informants will be interviewed, and interviews will be audio-recorded at the consent of the key informant.

All of the estimated 60 food service workers (15 from each hospital) across the four hospitals will be invited to participate in the KAP on the food handling component as well as the

perceptions component. At least 50 nurses from each hospital allocated to work in the wards (200 in total) will be invited at random to complete the questionnaire on perceptions. Some of the questions in the surveys have been adapted from existing material to better fit the aim of the study and the South African context. Meanwhile, some survey questions and audit sheets have been self-developed after a thorough review of the literature. The instruments will be assessed for face validity by experts in the field of nutrition and dietetics as well as a food service manager with extensive experience in hospital food services. Questionnaires will be piloted in a psychiatric hospital in the Western Cape and adapted if needed.

Data-analysis processes will primarily follow a quantitative approach. Findings will be presented in numerical format depicting frequencies, level of nutritional adequacy as compared to recommended intake standards, and proportions in tables and graphs. For selected variables such as knowledge or practices, odds rations will be estimated to study the association between these factors and the primary outcome (nutritional adequacy).

Ethical approval will be requested from the Biomedical Research Ethics Committee of the University of the Western Cape. Permission to conduct the study will be obtained from the Department of Health in the Eastern Cape and the four psychiatric hospitals. Informed consent will be obtained prior to the commencement of the interviews/survey. All participants will be assured that participation is voluntary and information will be handled with the utmost confidentiality. Reporting will be anonymised. Should the executive manager of a hospital request an individualised report, the anonymised information for that hospital only will be shared with the hospital.

1. INTRODUCTION

1.1 Introduction and background

In public healthcare, hospital food provisioning is often criticised for the quality and nutritional adequacy of the meals served. Nutritional adequacy may be gauged to determine the risk of deficiency of nutrients in terms of low intakes or high intakes. Nutrition psychiatry and nutrition psychology are growing disciplines that focus on the use of food and supplements to provide essential nutrients, as well as understanding the relationship between nutritional behaviour and mental health as part of an integrated or alternative treatment for mental health disorders (Sarris et al., 2015). Imbalances in nutrient intake by patients often result in malnutrition. When malnutrition occurs during hospitalisation, it is commonly described as iatrogenic malnutrition and has adverse effects on patient recovery and is associated with increased cost of care, increased length of stay as well as mortality (Wenhold & Faber, 2008; Caccialanza et al., 2013). In this regard, there is a need to direct attention towards nutrition psychiatry and nutrition psychology as part of the management of mental health disorders in addition to clinical management. However, a growing number of reports around South Africa have flagged an increase in cases of poor food quality and quantities served to patients in public psychiatric hospitals.

Mental health disorders are one of the main causes of disability globally (World Health Organization, 2018). More than 17 million people in South Africa are suffering from a mental disorder, such as depression, anxiety, substance abuse, bipolar disorder and schizophrenia (South African Depression and Anxiety Group & Sunday Times, 2014). However, mental health disorders are often misunderstood and are perceived in dissimilar ways by different cultures. The stigma attached to mental illness is a contributing factor in the slow-moving efforts to effectively quantify the burden of mental health disorders.

1.2 Problem statement

Despite the increasing efforts by South Africa's Department of Health to improve service delivery by food service units in public hospitals through staff training and provision of resources, more work is needed to improve the nutritional status of adult patients, and the nutritional adequacy and quality of food provided in the hospital setting in an effort to care for those with mental health disorders in South Africa. It is worth noting further that while much

is known about the economics of the private hospital service in South Africa, literature on the nutritional adequacy and quality of food provisioning in psychiatric hospitals is rarely available. According to Van Tonder et al. (2018), in a study conducted in two public hospitals in South Africa, 72.3% of patients were malnourished (42.8% regarded as high risk and 24.1% regarded as medium risk) based on the mid-upper-arm circumference (MUAC). Iatrogenic malnutrition, i.e. malnutrition in hospitalised patients, often goes unnoticed (Van Tonder et al., 2018) and results in delayed recovery, prolonged hospital stays, increased risk of morbidity and increased hospital costs (Caccialanza et al., 2013).

1.3 Purpose of the study

The purpose of the study is to assess the nutritional adequacy and quality of food provided to adult psychiatric patients in public psychiatric hospitals as well as the factors that affect the quality of food provisioning, including staff members' understanding and perceptions of the nutritional needs of psychiatric patients in Eastern Cape public psychiatric hospitals.

1.4 Significance of the study

The study will contribute to the understanding of the quality of food provisioning to patients in psychiatric hospitals by assessing the quality and nutritional adequacy of meals served to patients in the four psychiatric hospitals in the Eastern Cape, and the factors associated with the quality of meals provided. Knowledge gained from this study may inform food service managers, nursing personnel, as well as institutional management on the nutritional needs of the patients, the efficacy of food service systems, as well as the allocation and management of resources to the food service units.

1.5 Research questions

- What is the nutritional adequacy of food provided to adult psychiatric patients in psychiatric hospitals in the Eastern Cape?
- What factors contribute to the food provisioning and food intake of adult psychiatric in-patients in the four psychiatric hospitals?
- What is the knowledge, attitude and practices of food handlers in terms of food quality provided by hospital food services to hospitalised psychiatric patients?

- What are the perceptions of healthcare workers working in psychiatric hospitals of the nutritional needs of mental health patients? This may be a factor in the quality of food provisioning to the patients pre-, post- or during hospitalisation.

1.6 Aim of the study

The aim of the study is to assess the nutritional adequacy and quality of food provided to adult patients in public psychiatric hospitals in the Eastern Cape.

1.7 Research objectives

- To determine and evaluate adult patient food intake over three consecutive days through a plate-waste study in the four public psychiatric hospitals in the Eastern Cape province.
- To determine the factors associated with food provisioning to adult patients in Eastern Cape public psychiatric hospitals.
- To assess the knowledge, attitude and practices (KAPs) of food handlers in terms of food handling and food preparation in Eastern Cape psychiatric hospitals, a contributor to the quality of food (end product).
- To explore the perceptions of staff of the nutritional needs of psychiatric patients.

1.8 Outline of the thesis

Chapter 1: will describe the background and contextualisation of this study as well as the aim and objectives of the research. A brief highlighting of the research methodology and methods used to ensure the validity and reliability of the study will also be provided. Chapter 2: will review relevant literature for the study. Chapter 3: will examine the research methodology and seek to describe the study methodology used. Chapter 4: intends to present the results. Chapter 5: will present the discussion, conclusion and recommendations drawn from the study.

2. LITERATURE REVIEW

2.1 Introduction

The importance of good nutrition and food consumption cannot be overstated, especially when it comes to a patient's well-being and recovery from illness. Nutritional adequacy is defined as the difference between the nutrient requirement and the intake of a certain individual or population (Quezada, Vinas & Majem, 2014). Nutritional adequacy may be used to determine the risk of deficiency of the nutrients assessed in terms of low intakes or high intakes. In a hospital setting, maintaining the nutritional status of a patient is essential for their recovery from an illness. When nutrition is compromised due to an insufficient intake of nutrients, some organs in the body such as the brain are affected and as a consequence mental health is compromised.

Therefore, it is for this reason that adequate nutrition and nutrition therapy should be recognised as a cornerstone of mental health interventions in clinical practice guidelines and standards of care for psychiatric patients as they play a significant role in both curative and preventive approaches to disease management. According to Monteiro (2015), the factors contributing to the mental healthcare disparities in Africa include individual and community level challenges, such as low priority given to mental health or the lack of a clear mental health policy, poor health infrastructure and a lack of funding, insufficient numbers of trained specialists, the lack of evidence-based and culturally aligned assessment and treatment, stigma, discrimination and human rights abuses.

2.2 Assessing nutritional adequacy in hospital settings

The nutrition care process (NCP) is designed to provide a standardised approach to providing nutrition care to in-patients. In hospital settings, as a way of assessing the nutritional intake of food by in-patients and determining the consumption of food served to hospitalised patients, plate-waste audits are conducted to assess and evaluate the food that goes uneaten by patients after the patients have finished eating.

The assessment is essential for maintaining the nutritional status of patients and to promote recovery from an illness. When nutrition is compromised due to an insufficient intake of nutrients, some organs in the body, such as the brain, are affected. As a consequence, mental health is compromised. Adequate nutrition and diet therapy should therefore be recognised as a cornerstone of mental health interventions in clinical practice guidelines and standards of care for psychiatric patients.

2.3 Risk factors impacting mental health

Growing up in poverty is associated with toxic stress that can influence child development and health. Exposure to too much chronic stress over a prolonged period has detrimental effects on an individual's brain (Elliot, 2016). There is growing evidence that people with the lowest socio-economic status (SES) face eight times greater relative risk of developing schizophrenia than those with the highest socio-economic status (Elliott, 2016). According to Statistics South Africa (2015), the group most susceptible to poverty are females, especially those living in rural areas, mostly in the Eastern Cape and Limpopo. According to Hyman (2000), people with mental illness are traditionally thought to be distinctive, including those suffering from autism, ADHD, bipolar disorder, major depression and schizophrenia, and have genetic factors that cause their mental status.

2.4 Prevalence of mental health illness

The public health significance of mental health disorders is validated by the fact that they are among the most important causes of morbidity in primary care settings and produce considerable disability (Vigo et al., 2016). Although often disregarded as a disease, the burden of disease of mental health disorders globally is estimated to account for approximately 32.4% of years lived with disability and 13% of disability-adjusted life years (Vigo et al., 2016). In the African context, as asserted by Mbanga et al. (2002), mental illnesses are perceived as spirit possessions and are often associated with witchcraft.

2.5 Risks associated with inadequate dietary intake and malnutrition

Nutrition support forms part of the holistic care of patients in healthcare facilities. However, malnutrition is common in patients who are hospitalised and continues to go unrecognised and untreated in many hospitalised patients (Tappenden et al., 2013). It is estimated that malnutrition affects at least one in three patients in developed countries upon hospital admission (National Association of Clinical Nurse Specialists, 2017). Among patients who are not malnourished at admission, it is estimated that one in three may become malnourished during their hospital stay. In essence it is estimated that 20–50% of hospitalised adult patients may be malnourished. The most susceptible individuals to malnutrition during hospital stays include adults aged 65 and older, those already underweight, those of black race/ethnicity and lastly adults with a lower socio-economic status (National Association of Clinical Nurse Specialists, 2017).

2.6 The relationship between nutrition and mental health

There are many nutritionally related causes of depression, the most common being sub-optimum nutrition resulting in poor mental and physical health. A deficiency in omega-3 fatty acids, vitamin B such as folate and magnesium due to inadequate intake have been linked to depression (Rao et al., 2008). Good nutrition contributes to the capacity of an individual to adapt to the stresses of life (Halford, 2004) and to improved mental clarity, mood, concentration, sleep patterns and resistance to infections. The prenatal period also has a significant impact on physical, mental and cognitive outcomes both in the early years and throughout life (Allen et al., 2014). Moreover, childhood hunger is a predictor of depression and suicidal ideation during late adolescence and young adulthood (McIntyre et al., 2013).

2.7 Hospital staff perceptions of the nutritional needs of patients

Clinically, mental illness is perceived as psychologically related disorders, managed and treated using the western medical approach. However, in the African context, mental illnesses are perceived as ancestral spirit possessions and are highly recognised among the Zulu and Xhosa cultures of South Africa (Niehaus, 2004). Although most of the causes of mental illness are perceived to be due to ancestral spirits, witchcraft is another phenomenon that is suspected when people suffer from mental disorders (Sokhela, 2009). Within these cultural perceptions, nutritional needs do not feature. Monteiro (2015) asserts that social beliefs that give rise to a lack of knowledge, negative attitudes and the perceived stigma of mental health may result in those suffering from mental illness staying away from the opportunity to receive medical treatment, thus increasing and worsening the state of mental health in South Africa.

2.8 Food provisioning in public psychiatric hospitals

Food provisioning in South African public hospitals is realising the right to adequate nutrition as enshrined in Section 27 of the Constitution (South Africa Constitution, 1996). According to the National Food Service Policy of South Africa (DoH, 2013), it is estimated that a daily intake of 2230 calories by an average South African is sufficient to satisfy basic nutritional and energy needs. A plate-waste study is one method used to assess the nutritional adequacy of meals served in a hospital. Williams and Warton (2011) define plate waste as the volume or percentage of food served that is later discarded. The plate is quantified by the examination of the food left on the plates by the patients when they are finished eating. It is worth noting the growing number of reports of poor food quality and quantities served in public psychiatric

hospitals by in-house food services. However, food service provision in the South African health sector is not a well-researched domain and therefore there is limited literature on this topic.

2.9 Factors that may affect food provision in public hospitals

There is a paucity of information on the factors affecting the provision of food in public psychiatric hospitals in South Africa. Drawing on international literature, possible contributing factors to the quality of food provided by food service units in public hospitals include financial resources (e.g. budgets and staff allocation) (Musyoka, Ochieng & Nzioki, 2016), supply chain management practices (Kanyoma & Khomba, 2013), the recruitment of food service personnel and the availability of relevant training on the implementation of food quality standards, such as ISO 22000 and Hazard Analysis Critical Control Points (HACCP), as well as prerequisite programmes (Kibe & Wanjau, 2014).

Conclusion

The nutritional and mental health status of hospitalised patients is affected by various factors during hospitalisation. The late detection of malnutrition among patients during their hospital stay has an adverse effect on the health budget. Cost-effective strategies to determine the nutrient intake of patients in healthcare settings, e.g. by conducting plate-waste audits (Williams & Warton, 2011), must be promoted and prioritised. It is imperative to address severe nutrition and mental health problems by re-enforcing advocacy to direct more attention at nutrition and mental health, as well as create within society mental health-friendly settings to change the stigma attached to mental illness.

3. METHODOLOGY

This section seeks to describe and explain the research approach, design and procedures that the study will employ.

3.1 Research design

For this study, a descriptive cross-sectional research design will be used. A cross-sectional study is an observational study that analyses data from a population or a representative subset of a population at a specific point in time. Given the constraints in terms of the time available to conduct the study, it is impossible to consider and reach all entities that comprise the population, and therefore a small part of the population will be selected to represent the whole population. This type of research design is cost-effective and less time is required to conduct research (Setia, 2016). In this design, the audit of the food service unit as well as the knowledge, attitude and perceptions of the staff (secondary dataset) will supplement the primary component of the study by providing the reasons for the findings on the nutritional adequacy of the food provided to patients, as determined from the plate-waste and nutrient analysis which is the primary component (Centre for Innovation in Research and Teaching, 2019).

Although qualitative components such as document reviews and interviews will be conducted, all instruments will have a quantifiable outcome measure, and will thus be deemed primarily quantitative.

3.2 Study setting

The study will be conducted in four public psychiatric hospitals in the Eastern Cape. The Eastern Cape province has a population of 6 522 700 and is divided into six districts (divided into 31 local municipalities) and two metropolitan municipalities, namely Buffalo City and Nelson Mandela Bay.

A total of 1153 patients can be accommodated in the four psychiatric hospitals, with Tower Hospital being the largest with a capacity of 400 hospital beds, followed by Fort England Hospital with 313 hospital beds, Komani Hospital with 310 hospital beds and Elizabeth Donkin Hospital with approximately 130 hospital beds (Eastern Cape Socio Economic Consultative Council, 2017). Most patients are Xhosa-speaking, estimated at 92.7% across the four hospitals (Eastern Cape Socio Economic Consultative Council, 2017).

3.3 Study population

The study will include all four public psychiatric hospitals in the Eastern Cape. In a study population, it is impossible to consider and reach all entities that comprise it, and therefore a small part of the population will be selected to represent the whole population (Zimba, 2016). The target population of the study are health workers, including food handlers (also referred to as food service aids), nurses, food service managers and support service personnel in public psychiatric hospitals in the Eastern Cape.

The criteria for selecting the target population for the study are based on the commonalities of the chosen four psychiatric hospitals, which include:

- They are all government-funded hospitals that provide psychiatric care, treatment and rehabilitation as well as food service functions to psychiatric in-patients.
- The target participants and key informants directly or indirectly contribute to food provision either through food procurement or directly through nutrition care by preparing and cooking food or direct feeding of the patient.
- All the hospitals have in-house food service units which have the same food service system and are managed by a food service manager and a team comprising food service handlers and food service supervisors.
- The four psychiatric hospitals use a standard 14-day cycle menu throughout the year without seasonal change.
- The cooking of meals, including snacks, is done in the food service units and then transported to the wards with the use of trolleys and vehicles in some hospitals, depending on the facility structure.

Figure 1: A map indicating the location of the four psychiatric hospitals in the Eastern Cape province, South Africa (Google Maps, 2018)

Data-collection tools will be adapted for the specific South African context to ensure the validity and reliability of the study.

3.4 Data collection and analysis

3.4.1 Plate-waste audit

A plate-waste audit is one method used to assess the nutritional adequacy of meals served in a hospital. Plate-waste audits are crucial in hospital settings as they are a methodology used in hospital food services to determine the amount of food that remains uneaten on patients' plates after a meal (Strotmann, 2017). Williams and Warton (2011) define the plate waste as the volume or percentage of food served that is later discarded. The plate is quantified by the examination of the food left on the plates by the consumers when they are finished eating. Plate-waste audits can be done in two ways, namely using the weighing estimation and using visual estimation. The benefit of a plate-waste study is that it gives the opportunity to identify why the patients are not eating certain food items and allows changes to be made (Strotmann, 2017), particularly to the menu design.

A bulk waste study will include weighing and recording all food delivered to the wards and dished to patients in two wards over three consecutive days of the five data-collection days per hospital. The mealtimes to be assessed will include breakfast, lunch and supper as well as

snacks provided in between the three main meals and comparing them with the requirements of food ration scales for hospitals and health institutions.

Food issued to each ward selected to participate in the plate-waste audit will be weighed before dishing and at least five plates will be weighed after dishing and the data recorded. When patients have finished eating and plates have been collected from the dining areas, excess food left uneaten on the plates will be separated into clear bags coded per food group and later weighed to determine the quantities of waste after each mealtime.

The food consumed will be analysed using Food Finder software version 3 and an average nutrient intake per person will be calculated in accordance with the Recommended Dietary Allowance (RDA) guidelines for South Africa, 2013.

3.4.2 Questionnaires

As one of the methods of collecting data, the researcher will use questionnaires, which constitute the basic tool used in survey-based research, as noted by Anguita et al. (2003). A questionnaire, originally an ethnological method (Eckerdal & Hagstrom, 2017), is described by Mora et al. (2016) as a document that collects in an organised way the indicators of the variables associated with the objective of the survey. For the purpose of this study, the researcher will use the questionnaire (Appendix 15, 16, 17, 20 and& 21) to elicit more in-depth information from the participants and informants in order to answer the study's main research questions. The questionnaires will be distributed on the second day in each hospital to give sufficient time for the participants to complete them. The questionnaires have been formulated by the researcher in accordance with the study's research questions.

The perceptions of healthcare workers with regard to the nutritional needs of mental health patients will be determined by the researcher. In each of the four public psychiatric hospitals, a sample of 50 healthcare workers will be randomly selected using a structured questionnaire. This is because the use of questionnaires tends to be a very reliable research method and can be widely used to reach people in a short period of time (Anguita et al., 2003).

3.4.3 Open-ended interviews

Key informants will be interviewed (Appendix 18 and19) on the first day and thereafter if it is necessary. Informants will include food service managers, ward-based food handlers, the chief executive officer (hospital manager), operational managers from the nursing component and

two supply chain officers (i.e. assistant director/deputy director and a buyer in each hospital). Interviews will be recorded electronically and this fact will be made clear on the participants' consent forms before the data-collection process commences. Semi-structured interviews have the potential to provide reliable and comparable qualitative data (Blandford, 2013).

According to the CSR (Centre for Strategy Research Boston) (2006), the core and primary benefit of electronically recording interviews is that it allows the researcher to focus and concentrate attentively on the participants' responses rather than spend time writing notes, which can distract both the researcher (interviewer) and the interviewee. Moreover, electronically recorded interviews allow the interviewer and the interviewee the opportunity to foster a better relationship and rapport during the interview, which will lead to the participant or key informant disclosing more in-depth information (CSR/Centre for Strategy Research Boston, 2006). The information obtained from the interviews will be used to complete the food service audit.

3.4.4 Observations

According to Kawulich (2005), participant observation is the process of learning through exposure to or involvement in the day-to-day or routine activities of participants in the research setting. The researcher will conduct a general audit in the hospital food services, ward kitchens and main storage facilities using a standard checklist to observe food service systems as well as availability of storage areas and equipment (Appendix 10–13).

A limitation of observations is that people tend to alter their behaviour when they know they are being watched (Oda et al., 2015) and the method itself is subject to bias if it is not validated by another data-collection method (Mohajan, 2017). In order to address bias, the researcher will use other data-collection methods such as key informant interviews and the plate-waste study to triangulate information. Additionally, the researcher will arrive at determinations through the observation process and the review of food service documents.

3.4.5 Document review

In South Africa, supply chain management and procurement is central to the government service delivery system (Bolton, 2006). Thus, public procurement is defined as a function whereby public sector organisations acquire goods and services and enter into agreements with suppliers, subject to a range of general principles being met (Bolton, 2006). The five principles

of supply chain, in no chronological order, are: value for money; transparency; ethics and fair dealing; accountability; and competitiveness and equitability. It is for this reason that supply chain and procurement documents, such as food specifications (including those for perishable foods), supplier compliance documents (DoH, 2007), and contract management and bid documents specifically related to food provision will be reviewed and the findings recorded.

In addition, the researcher will review and analyse food service financial records (trends in cost per meal per patient) compared with the budget allocations for the past five years in order to observe and identity important information that may help to answer the research questions supporting the study.

3.5 Sampling technique and size

Alvi (2016) asserts that in non-probability sampling, not every group in the population gets an equal chance of participating in the investigation. Purposive sampling, as described by Palinkas et al. (2013), entails the identification and selection of information-rich research participants for the most effective use of resources, and the identification of those knowledgeable about or experienced in a phenomenon of interest (Creswell & Clark, 2011). The detailed and accurate data collected will be used in selecting key informants and participants for the study.

Purposive sampling requires less time to complete and is economical. To provide additional or auxiliary information and to increase the effectiveness and efficiency of the data to be collected, demographic information will be obtained through the use of questionnaires. For the purpose of this study, the research will randomly select two wards per hospital in which to conduct the plate-waste study. The plate-waste study will be conducted at every meal over three consecutive days. This will provide a good representation of the standardised two-week-cycle menu used in all four hospitals.

In each of the hospitals a sample of at least 50 nurses who are allocated to work in the wards will be approached randomly until a quota of 50 has been achieved for the assessment of staff knowledge and perceptions of the nutritional needs of psychiatric patients. All food handlers will be included in assessing KAPs in terms of food preparation and dishing at ward level. All hospital staff relevant to supply chain, food procurement and management of food preparation and serving will be interviewed to obtain information for the audit.

3.6 Data analysis

Data collected using the questionnaire will be coded, grouped (Saldana, 2008) and analysed using statistical software such as Food Finder software version 3 as well as Statistical Package for the Social Sciences software version 23, respectively. Descriptive and inferential statistical analysis will be conducted, and findings will be presented in discussion form, graphs, figures and visuals to represent themes. The determination of the nutrient composition of food provisioning will use quantitative measures using Food Finder software version 3 as a reference for the analysis. The audit (observations) and KAP of participants will be measured using an open-ended-questionnaire (Gajjar et al., 2017) as a qualitative measure. Data-analysis processes will primarily follow a quantitative approach with perceptions being assessed using Likert scales. The research design will follow a quantitative approach using a descriptive cross-sectional design.

Clark and Creswell (2008) assert that all methods of data collection have limitations and therefore the use of multiple methods can neutralise or cancel out some of the disadvantages of certain data-collection methods. Hence, there is value in using a questionnaire and observation to strengthen the validity and reliability of this study. Chi-square testing will be used to assess statistical significance differences between hospitals, with the cut-off point for statistical significance set at $p<0.05$. Fisher's exact test will be used to test significance when cells were not normally distributed, e.g. when the sample size is smaller than five.

3.7 Validity

In a qualitative study, rigour is important as it helps to ensure that the study is credible and provides an accurate reflection of what the participants expressed. In ensuring the validity and reliability of the data-collection instruments, the researcher will ensure content validity by adapting some questions from similar published work to the local context. During data collection, the researcher will use triangulation and member checking to ensure rigour in the study. For the purpose of enhancing the credibility and validity of the study, the researcher will obtain a face validity review from expects (a nutritionist and a dietician) with extensive healthcare and food service experience. Moreover, the questionnaires will be further validated by conducting a pilot test at a psychiatric hospital in the Western Cape. The use of computer programs such as Food Finder software version 3 to quantitate plate waste and SPSS version 25 will enhance the systematic analysis of data.

3.8 Confidentiality and risk of the study

The researcher will assure that the participants' privacy and anonymity are respected, which is paramount before participants partake in the study. To ensure participants' anonymity, the researcher will not record any identifying information from the participants. The participants will be assured that all data collected, including all hard copies such as consent forms, observation checklist, interview notes and questionnaires, will be kept in a lockable cabinet and converted to soft copies which will be password-protected. Only the researcher and researcher's supervisor will have access to the information and no third-party access will be permitted to the recordings, except the researcher's supervisor. Results will be reported in anonymised reports. Should the executive manager of a hospital request a report, the anonymised information for that hospital only will be provided in a separate report.

3.9 Ethics

The participants will be provided with an information sheet explaining the purpose of the study. The consent form in which the participants will agree to partake in the study will also be discussed prior to the commencement of the data-collection process. On the consent form, the participants will be reassured that they would not be intimidated or unjustly treated if they refused to participate in the study. Moreover, it will be emphasised that participation is voluntary, and they may withdraw from participating in the study at any stage when they wish to do so, with no penalties.

Data-collection forms and participant information sheets will be translated into isiXhosa to ensure that all participants clearly understand the intention of the study. The interviews will be conducted in the participants' language of choice, including the dominant language, thereby allowing the participants to express themselves better than they would if they used a second language. This will be an added advantage to the researcher who is conversant in both English and isiXhosa. Evidence of the study's approval by the University of the Western Cape's Biomedical Research Ethics Committee [BMREC] and the Eastern Cape Department of Health will be provided to the participants. Findings will be disseminated to the research community and the Eastern Cape Department of Health.

3.10 Scope and limitation

There is limited published research on the nutritional adequacy and quality of food provided to adult psychiatric patients in public hospitals both in the Eastern Cape and in South Africa generally. Therefore, accessing documents and local literature pertinent to the research will be

difficult. This may influence the data-collection process. In view of the estimated sample size, the findings of this study cannot be generalised to a larger population, and therefore the research cannot be deemed to represent all public hospitals in South Africa. Another possible limitation is the time available to conduct the study and examine the research problem. Accordingly, there will doubtless be a need for future (such as longitudinal) studies.

3.11 Schedule for completion

Milestones in the research process	**Deadline for completion**
Submission of the research proposal	March 2019
Literature review	April 2019
Data collection – field work	May and June 2019
Results and data analysis	June and July 2019
Discussion of results	August and September 2019
Conclusion and recommendations	September 2019
Editing and proofreading	October 2019
Submission of final research paper	November 2019

REFERENCES

Alvi M. (2016). A Manual for Selecting Sampling Techniques in Research. University of Karachi, Iqra University. Downloaded: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwiZz5D797PcAhXK1qQKHcykDnUQFggnMAA&url=https%3A%2F%2Fmpra.ub.uni-muenchen.de%2F70218%2F1%2FMPRA_paper_70218.pdf&usg=AOvVaw2D9iINxVBqV90hfm4Xx1VQ. Accessed 08/4/2018.

Blandford A. (2013). Semi-Structured Qualitative Studies.

Centre for Health Research Policy. Downloaded: http://healthpolicy.ucla.edu/programs/healthdata/trainings/documents/tw_cba23.pdf

Davidson P.M. & Halcomb E.J. (2006). Is Verbatim Transcription of Interview Data Analysis Always Necessary? Downloaded: https://pdfs.semanticscholar.org/e2b8/0fa42024f8412c04f92809c12f4b3ab3ef23.pdf.

Department of Health. (2007). Specifications for Perishable Food.

Department of Health. (2010). Policy for the Food Service Management in Public Health Establishments. *Applied Nursing Research 19: 38-42.*

Gajjar B., Mizra N., Gor A., Mistry M. & Shah N. (2017). A Qualitative Study of Knowledge, Attitudes and Practices Towards Pharmacovigilance Among Doctors and Nursing Staff in a Tertiary Care Hospital in India. *Journal of Clinical and Diagnostic Research. Vol 11: (4).*

Hyman M.R. & Sierra J. (2016). Open – versus Closed-Ended Survey Questions. Vol:14. Downloaded: https://www.researchgate.net/publication/282249876_Open-_versus_close-ended_survey_questions/download. Accessed: 20 August 2018.

Kanyoma K.E. & Khomba J.K. (2013). The Impact of Procurement Operations on Healthcare Delivery: A Case Study of Malawi's Public Healthcare Delivery System.

Laur C., Marcus H., Ray S. & Keller H.H. (2017). Malnutrition Knowledge, Attitudes and Perceived Practices (M-KAP).

Laur C., Valaitis R., Bell J. & Keller H. (2017). Changing Nutrition Care Practices in Hospital: A thematic analysis of hospital staff perspectives.

Leung L. (2015). Validity, Reliability and Generalizability in Qualitative Research. Downloaded: https://www.researchgate.net/publication/281172234_Validity_reliability_and_generalizability_in_qualitative_research. Accessed 14 August 2018.

McIntyre L., Williams J.V., Lavorato D. & Patten S. (2013). Depression and Suicide ideation in late Adolescence and early Adulthood are an outcome of Childhood Hunger.

Downloaded:https://www.jad-journal.com/article/S0165-0327(12)00782-3/fulltext. Accessed 25/05/2018.

Mohajan H. (2017). Research Methodology. Downloaded: https://mpra.ub.uni-muenchen.de/83457/1/MPRA_paper_83457.pdf. Accessed: 14/02/2019.

Oda R., Kato Y. & Hiraishi K. (2015). The Watching Eye Effect and Prosocial Lying. Downloaded: https://www.researchgate.net/publication/282803842_The_Watching-Eye_Effect_on_Prosocial_Lying/download. Accessed 2/08/2018.

Saldana Z. (2008). An Introduction to Codes and Coding. Chapter 1. Pg 1-31.

Setia M.S. (2016). Methodology Series Module 3: Cross-sectional Studies. Indian journal of dermatology, 61(3), 261–264. doi:10.4103/0019-5154.182410

South African Constitution. (1996). Downloaded:

South African Human Rights Commission. (2016). The Right to Access to Nutritious Food in South Africa. Downloaded: https://www.sahrc.org.za/home/21/files/Research%20Brief%20on%20The%20Right%20to%20Food%202016-2017.pdf. Accessed 24/3/2018.

South African Mental Health Care Act. (2002). Mental Health Act 17 of 2002. Downloaded: https://www.gov.za>files>gcis_document

Tappenden K.A., Quatrara B., Parkhurst M.L., Malone A.M., Fanjiang G. & Ziegler T.R. (2013). Critical Role of Nutrition in Improving Quality of Care: An Interdisciplinary Call to Address Adult Hospital Malnutrition.

Wenhold F. & Faber M. (2008). Nutritional Status of South Africans: Links to Agriculture and Water. Downloaded: http://www.scielo.org.za/pdf/wsa/v35n1/a08v35n1.pdf

APPENDIX 2A:

FOOD HANDLER KNOWLEDGE OF AND ATTITUDES TOWARDS PATIENT FOOD QUALITY

QUESTIONAIRE 1

No.	Knowledge of and attitudes of hospital staff towards patient food quality	Place an X in the box that applies to you				
		Strongly agree	Agree	Not sure	Disagree	Strongly disagree
1.	The mission and aim of the food service department is to ensure the production of meals that are safe for consumption, nutritionally balanced, and adequate in quality and quantity. *Uxanduva nenjonga yecandelo lwezokutya kukuqinisekisa ukhuseleko lwemveliso yokutya okuse lungelweni lokutyiwa, okunezakha mzimba ezifanelekileyo, okwaneleyo kunye nokuse mgangathweni.*					
2.	Complying with regulations and laws pertaining to food production is important to me in order to produce quality and safe meals for the patients. *Ukulandela imigaqo nemithetho yemveliso yokutya kubalulekile kum, malunga nokuvelisa ukutya okuse mgangathweni nokhuseleko lwezigulane.*					
3.	Thawing of food must be done in the refrigerator, not in water or direct sunlight. *Ukunyibilikiswa komkhenkce ekutyeni makwenziwe kwisibandisi, kungenziwa emanzini nase langeni ngqo.*					
4.	Using a recipe and following it when preparing meals for patients is important for the quality of the end product I will produce. *Ukusebenzisa I recipe nokulandela imigaqo yayo xa ndipheka kunendima ebalulekileyo ekuyi dlalayo kumgangatho wemveliso yokutya kwezigulane.*					

5.	Meals prepared in hospital kitchens for patients should be of good quality, have a good taste and an appetising appearance. *Ukutya okulungiselwe kumakhitshi ezibhedlele ukulungiselala izigulani kufanele ukuba kubese mgangathweni, kubenencasa kwaye kubene nkangeleko eluncuthu*.					
6.	Training in food production and food quality would be beneficial in improving my skills and personal development. *Uqeqesho malunga nokhuseleko lokutya ne mveliso yokutya kungaba yinzuzo ekuphuhliseni mna nezakhono zam.*					
7.	I believe I do not need to attend food preparation training because I have sufficient knowledge about food production and food quality. *Ndinenkolo yokuba andikudingi ukuya kuqeqesho lokupheka njengoko ndinolwazi lwaneleyo malunga nemveliso yokutya okuse mgangathweni.*					
8.	I believe I do not need to attend food preparation training because I have enough experience in food services. *Ndinenkolo yokuba andikudingi ukuya kuqeqesho lokupheka njengoko ndinamava okuvelisa ukutya kwicandelo lwezokutya.*					

THANK YOU FOR YOUR PARTICIPATION! ENKOSI NGENXAXHEBA YAKHO!

APPENDIX 2B:

NURSES' PERCEPTIONS OF THE NUTRITIONAL NEEDS OF PSYCHIATRIC PATIENTS

QUESTIONNAIRE 2

SECTION A:

No.	Patient nutrition care	Place an X in the box that applies to you				
		Strongly agree	Agree	Not sure	Disagree	Strongly disagree
1.	Nurses play an important role in preventing iatrogenic malnutrition.					
2.	Nutrition forms an integral part in patient recovery during a hospital stay. Are you trained in the nutritional care of patients?					
3.	Patients are at risk of suffering from malnutrition if provided with an imbalanced diet daily.					
4.	Malnutrition in all forms is a serious risk to the health of hospitalised patients.					
5.	Late detection of malnutrition has adverse effects on the patients' health.					
6.	Monitoring the nutritional status of patients is my responsibility as a nurse.					
7.	I am equipped to calculate the body mass index of a patient (BMI).					
8.	I have the necessary resources to conduct malnutrition screening (malnutrition screening tool).					
9.	Psychiatric patients deserve to be provided with meals that are of acceptable quality and safe for human consumption, whether they are hospitalised or not hospitalised.					
10.	Patients must be encouraged to finish their meals to ensure sufficient nutrient intake after each meal.					
11.	Patients who are unable to eat due to medical reasons must be assisted to ensure that they finish or at least eat enough to ensure sufficient nutrient intake.					

12.	Patients who have difficulties with swallowing must be prescribed to eat a suitable diet (soft, clear fluid, puree) depending on their medical condition.					
13.	Iatrogenic malnutrition to adult patients can be prevented through optimum nutritional care.					

SECTION B:

No.	**Solutions to improving nutritional awareness of psychiatric patients**	**Place an X in the box that applies to you**				
		Strongly agree	Agree	Not sure	Disagree	Strongly disagree
1.	Creating awareness about the nutritional needs of psychiatric patients is of significance in public healthcare.					
2.	Availability of resources to conduct nutrition screenings and nutrition assessments.					
3.	Availability of training for nurses on nutrition screenings and nutrition assessment.					
4.	Incorporating patient nutrition care as part of nursing care.					
5.	Improved communication channels between food service department and nursing services.					
6.	Improved financial support for health promotion strategies.					
7.	Institutional management support for patient nutrition care and awareness programmes.					

THANK YOU FOR YOUR PARTICIPATION! ENKOSI NGENXAXHEBA YAKHO!

APPENDIX 2C:

HYGIENE AUDIT CHECKLIST

The observation checklist is intended to help the researcher conduct **'An assessment of the nutritional adequacy and quality of food provided to adult psychiatric patients in public psychiatric hospitals in the Eastern Cape**'.

SECTION A: HYGIENE

No.	Question	Coding category Yes/No		Comments
FOOD-HANDLING PERSONAL HYGIENE				
1.	Employees wear clean and protective clothing.			
2.	Employees wear safety shoes.			
3.	Effective hair nets are properly worn.			
4.	Fingernails are short, unpolished and clean.			
5.	Hands are washed properly and frequently after changing work stations.			
6.	Staff are provided with changing room facilities and toilets in the main kitchen.			
GENERAL HYGIENE				
7.	Procedures are in place to prevent cross-contamination.			
8.	Both cooked food and raw food is separated and covered.			
9.	Food is handled with suitable utensils.			
10.	There is a soap dispenser with soap/bar soap.			
11.	A sanitiser dispenser is available in the kitchen.			
12.	The kitchen is kept clean.			

13.	Municipal hot and cold water is available in all hand-washing areas and at workstations.			
14.	Food equipment utensils and food contact surfaces are properly washed, rinsed and sanitised before use.			
15.	Handwashing reminder signs are posted at all workstations.			
16.	Colour-coded cutting boards are available.			
17.	Disposable cloths are available to wash dishes and work surfaces.			
18.	A dishwashing area to wash dishes is available.			
19.	Colour-coded brooms are available for use specifically in the kitchen.			
20.	Garbage bins are available in the kitchen.			
21.	There is a pigswill on the hospital premises.			

SECTION B: PREMISES, STORAGE AND EQUIPMENT

No.	**Question**	**Coding category Yes/No**		**Comments**
1.	Is the food listed below received/sourced from approved suppliers (licensed food establishments)?			
2.	I. Meat and meat products			
	II. Fresh fruit and fresh vegetables			
	III. Dairy, eggs and cheese			
	IV. Groceries (dry goods and canned items)			
3.	Food labelling of non-perishables delivered is compliant with South African national standards.			
4.	Dented cans are not received.			
5.	Does the food service unit have a visible production schedule?			

6.	Is there an approved cycle menu?			
7.	Raw food is weighed before issuing.			
8.	Is there a file with standardised recipes?			
9.	Recipes are followed at all times by the food handlers when preparing meals.			
10.	Is there a time schedule for dishing and delivering meals to the wards and is it followed?			
11.	Food is weighed on an electronic scale when dishing.			
12.	Food is dished using recommended serving utensils.			
13.	The gap between the serving time for supper/midnight snack and breakfast is not more than 12 hours.			
14.	Food is transported in a vehicle/trolley allocated strictly to deliver food to the wards and food service unit.			
15.	Food temperatures are taken and recorded before the food is delivered to the wards.			
16.	Is food served to the patients within 30 minutes of the time of delivery?			
17.	Are temperatures of food taken and recorded in the temperature log before dishing?			
18.	Is the vehicle/trolley delivering food hygienic?			
PREMISES, EQUIPMENT & STORAGE FACILITIES				
19.	There are designated storage areas for perishable and non-perishable food items.			
20.	Cold rooms/freezers are available.			
	Freezers/fridges are available.			
	There are food containers to store decanted food.			

21.	Does the food service unit have a separate thawing facility?			
22.	A separate storeroom is available to store cleaning chemicals.			
23.	The storage areas are temperature controlled.			
24.	The temperature of the storage facilities is checked regularly with a thermometer and temperature logs are displayed.			
25.	Food is correctly stored (on pallets, not directly on the floor). Is all food stored at a minimum of 15 cm above the floor?			
26.	Food items are dated/stored in a manner that ensures first in-first out. Are there store cards/bin cards?			
27.	There is an updated pest control register with a schedule of fumigation dates.			
28.	There is a visible cleaning schedule.			
29.	Floor and surfaces/shelves are clean.			
30.	There is an industrial oven to prepare food items that require cooking in the oven.			
31.	There are industrial steam pots/a stove to cook food.			

APPENDIX 3A:

ETHICS LETTER OF APPROVAL TO CONDUCT RESEARCH

UNIVERSITY of the WESTERN CAPE

OFFICE OF THE DIRECTOR: RESEARCH
RESEARCH AND INNOVATION DIVISION

Private Bag X17, Bellville 7535
South Africa
T: +27 21 959 4111/2948
F: +27 21 959 3170
E: research-ethics@uwc.ac.za
www.uwc.ac.za

23 May 2019

Ms A Getyeza
Dietetics and Nutrition
Faculty of Community and Health Science

Ethics Reference Number: BM19/3/15

Project Title: An assessment of the nutritional adequacy and quality of food provided to adult psychiatric patients in public psychiatric hospitals in the Eastern Cape.

Approval Period: 12 May 2019 – 12 May 2020

I hereby certify that the Biomedical Science Research Ethics Committee of the University of the Western Cape approved the scientific methodology and ethics of the above mentioned research project.

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

Please remember to submit a progress report in good time for annual renewal.

The Committee must be informed of any serious adverse event and/or termination of the study.

Ms Patricia Josias
Research Ethics Committee Officer
University of the Western Cape

BMREC REGISTRATION NUMBER -130416-050

APPENDIX 3B:

APPROVAL FROM EC HEALTH TO CONDUCT RESEARCH

Province of the
EASTERN CAPE
HEALTH

Enquiries: Zonwabele Merile
Email: Zonwabele.merile@echealth.gov.za
Date: 03 June 2019

Tel no: 083 378 1202
Fax no: 043 642 1409

RE: An assessment of the nutritional adequacy and quality of food provided to adult psychiatric patients in public psychiatric hospitals in Eastern Cape. (EC-201905-021)

Dear Ms A. Getyeza

The department would like to inform you that your application for the abovementioned research topic has been approved based on the following conditions:

1. During your study, you will follow the submitted protocol with ethical approval and can only deviate from it after having a written approval from the Department of Health in writing.

2. You are advised to ensure, observe and respect the rights and culture of your research participants and maintain confidentiality of their identities and shall remove or not collect any information which can be used to link the participants.

3. The Department of Health expects you to provide a progress update on your study every 3 months (from date you received this letter) in writing.

4. At the end of your study, you will be expected to send a full written report with your findings and implementable recommendations to the Eastern Cape Health Research Committee secretariat. You may also be invited to the department to come and present your research findings with your implementable recommendations.

5. Your results on the Eastern Cape will not be presented anywhere unless you have shared them with the Department of Health as indicated above.

Your compliance in this regard will be highly appreciated.

SECRETARIAT: EASTERN CAPE HEALTH RESEARCH COMMITTEE

APPENDIX 3C: STUDY INFORMATION SHEET

UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel : +27 21-959 2760 Fax : 27 21-959

E-mail: erosant@uwc.ac.za

INFORMATION SHEET

Project Title: An assessment of the nutritional adequacy and quality of food provided to adult psychiatric patients in public psychiatric hospitals in the Eastern Cape

What is this study about?

This is a research project being conducted by Asanda Getyeza at the University of the Western Cape. We are inviting you to participate in this research project because you are more involved with food provision of in-patients in a public psychiatric hospital with the hope of gaining a better understanding of all aspects relating food provisioning and nutritional care of psychiatric patients from your answers.

The purpose of this research project is to assess the nutritional adequacy and quality of food provided to adult patients in public psychiatric hospitals in the Eastern Cape.

What will I be asked to do if I agree to participate?

1. You will be asked to participate in an interview that will be audio-recorded with your consent.
2. The interview will be led by the primary investigator at your workplace at your own convenience.
3. The duration of the interview should be 30 – 45 minutes.
4. There are no right or wrong answers.
5. You will be requested to complete a questionnaire that will take 10 – 15 minutes.
6. An audit will be conducted in selected sections of the hospital and your cooperation will be appreciated when the investigator visits your section.

Would my participation in this study be kept confidential?

The researchers undertake to protect your identity and the nature of your contribution. To ensure your anonymity, the surveys will not contain any personal information about you and the hospital except for your views and opinions. In ensuring your confidentiality, all hospitals and interviewees will be alphabetically labelled in order to uphold confidentiality. Data collected will be locked in filing cabinets that only the researcher will have access to. Electronic data will be password-protected and only the researcher will have access. If we write a report or article on this research project, your identity will be protected.

What are the risks of this research?

All human interactions and talking about self or others carry some amount of risk. We will nevertheless minimise such risks and act promptly to assist you if you experience any discomfort, psychological or otherwise, during the process of your participation in this study. Where necessary, an appropriate referral will be made to a suitable professional for further assistance or intervention.

What are the benefits of this research?

This research is not designed to help you personally, but the results may help the investigator learn more about factors that affect the nutritional adequacy of food provisioning in Eastern Cape public psychiatric hospitals and the results will be used to make recommendations regarding nutritional care and food provisioning to the relevant facilities and governing bodies.

Do I have to be in this research, and may I stop participating at any time?

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalised or lose any benefits for which you otherwise qualify.

What if I have questions?

This research is being conducted by Asanda Getyeza from the Department of Dietetics and Nutrition at the University of the Western Cape. If you have any questions about the research study itself, please contact Asanda Getyeza at:

6 Athena Complex
Olympus Road
Brackenfell 7536
083 878 7673

Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

Prof Ernesta Kunneke
Head of Department: Dietetics and Nutrition
University of the Western Cape
Private Bag X17
Bellville 7535
ekunneke@uwc.ac.za

Prof Anthea Rhoda
Dean: Faculty of Community and Health Sciences
University of the Western Cape
Private Bag X17
Bellville 7535
chs-deansoffice@uwc.ac.za

This research has been approved by the University of the Western Cape's Biomedical Research Ethics Committee (Reference number: BM19/3/15).

Biomedical Research Ethics Committee
University of the Western Cape
Private Bag X17
Bellville
7535
Tel: 021 959 4111
e-mail: research-ethics@uwc.ac.za

UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel : +27 21-959 2760 Fax : 27 21-959

E-mail: erosant@uwc.ac.za

IPHEPHA LENGCAZELO

Isihloko Nkqubo:

InkqhuboyophandomalunganomgangathowesondlonezintoezithizibenomthelelakubonelelolokutyakwizigulaneezikwizibhedlelazabobanophazamisekolwengqhondokwiMpumaKoloni.

Zingantoni na ezizifundo?

Le yinkqubo –phando eyenziwe nguAsanda Getyeza njengenye yemfuneko ze Master's Degree kwi Nutrition kwisebe le Dietetics and Nutrition kwiDyunivesithi yaseNtshona Koloni. Siyani mema ukuba nibenendima emandla eniyidlalayo kulenkqubo - phandokubaninaningabantuesithisincancekuniinkcukachanolwazingaleNkqubo, ndithembakananjaloukubandothindizuzeokukhulunokuphangaleleyongokhuselekongonikezelolokutyakwizibhedlelezamobaphazamisekengokwasengqhondweningokweNkquboyeSizweyezibonelelozoKutyakwizibhedlelekwimpenduloeniyakuthinisinike zona.

EzonanjongozalenkquboyophandokukufumananokufunaukwazimalunganezintoezithizibenomthelelakubonelelolokutyanomgangathowokutyakwabobaphazamikengokwasengqhondwenikwizibhedlelazabobanophazamisekolwengqhondokwiMpumaKoloni.

Ulwazineenkcukachazothiziqokelelwengokuthisithethenabantungabantusibuzaimibuzoukujonganokuqaphelaphayakwizibhedleleeziyezachongwazichongelwaezizifundozophando.

Zeziphi na izinto eziya kulindeleka kum xa ndivuma ukuthatha inxaxheba?

1. Uyakucelwa ulindele ke ukuba uthatha inxaxheba ngokubuzwa imibuzo ngemibuzo eyakuthi ishicelelwe.
2. Imibuzo le iyakuba ichotshelwe yenye intloko kwi zisebenzi zalenkqubo ezibhedlela
3. Akukho mpendulo eyiyo nengeyiyo.
4. Uyakuthi kwakhona ucelwe ugcwalise ngokubhala Impendulo kwiphetshana lemibuzo.
5. Inkqubo yembuzo kufaneleke ukuba ithabathe malunga ne 30 ukuya kwi 45 yemizuzu
6. Kuza kwenziwa uphicotho ncwadi nophithoko lwendlela zokusenza kwisibhedlele ngasinye, intsebenziswano yakho iyakonwatyelwa.

Ingaba ukuthatha kwam inxaxheba kwezizifundo kuza kuba yimfihlona?

Abaphandibayazibophelelangokukhuselanokubaubeyimfihlowenanegalelolakho. Ukuqinisekisangemfihlonokhuselolwabathathinxaxhebaufundophandoolualuzukubanazoinkcukachazomthathinkxaxhebakwanezesikoloekuphandwengaso, ngaphandle kwembono nengcinga zakho. Ukuqinisekisa ngokhuseleko lwaba thathinxaxheba, zonke izibhedlele zakudweliswa ngoku qalaku A ukuya ku Z ngenjongo zokuqinisekisa ukhuselo lwaba thathinxaxheba. Okuthekwacholwa-cholwakoqokelelwakuzekufakwekwikhabhathizokugcinaamaxwebhuzitshixelwe, ibendim ndedwa one lungelo kuzo. InkcukachanamacwecweakwiKomputhaiyakuthiiqhotyoshwengeziqhoboshizeKomputha. Ukubasibhalaingxelomalunganenyekwezizifundozophandowonkeumntuuyakukhuselwangokumandla.

Yeyiphi imicela mngeni kolu fundophando.

Lonke igalelo nokusebenza noluntu, ukuthatha ngam nokuthetha ngabanye abantu kungu mcelimngeni kukodwa. Kodwakenangonakunjalosothisiwacuthelomathubasenzenonako-nakoukuncedanokuncedisaothiangafumanikuzolaemzimbeninasengqondweni, ngenxa yokuthatha inkxaxheba kulenkqubo yezizifundo. Aphokuthekwayimfunekokothikuchongweonguchwepheshenengcali koku ukuze angenelele ngoncedo ne zisombululo.

Iyintoni inzuzo ngezizifundo-phando?

Oluphando alwenzelwanga ukunceda wenabuqu, kodwa inceda abaxhasi ngemali ukuba bafunde lukhulu ngemeko zomgangatho wokutya noku baluleka kokutya okunesondlo ekunakekeleni abo baphazamisekileyo ngokwase ngqhondweni. Siyathemba ukuba kwi xa elizayo, abasemagunyeni kwisebe lwezeMpilo baza kufunda lukhulu koluphando baze baphucule ngendlela yokunakekela abo baphazamiseke ngokwase ngqhondweni.

Ndinyanzelekile ukuba ndibe yinxenye yoluphando-izifundo, kwaye ndingacela ukohlukana nolo naninina?

Ingxenye yakho koluphando uyenza ngokuthanda kwakho. Ukuba uyinxalenye yoluphando ungakhetha naninina ukohlukana nalo xa ufuna. Ukuba uye awafuna ukubayinxalenye noluphando, okanye uyeke sele uqalile asoze ubanjwe nganqalelo okanye uphuncukane namalungeakho.

Ndithini xa ndinemibuzo?

Oluphando eyenziwe nguAsanda Getyeza okwicandelo lezesikolo sikaWonke-wonke lwezeMpilo eDyunivesi yase Ntshona Koloni. Ukuba unemibuzo okanye ufuna ingcazelo ngezizifundo – phando xhomana no:

Asanda Getyeza
Unit 6 Athena Complex,
Olympus Road,
Brackenfell, 7536
083 878 7673/
asanda.getyeza@gmail.com

Ukuba unayo imibuzo ngokubhekiselele kwezizifundo namalungelo akho njengomthathinxaxheba kolufundo-phando okanye unqwenela ukunikeza ingxelo nangayo nayiphina ingxaki othe wayifumana ngokubhekiselele kwezizifundo nceda unxulumane no:

Prof Ernesta Kunneke
Head of Department: Dietetics and Nutrition
University of the Western Cape
Private Bag X17
Bellville 7535
rswart@uwc.ac.za

Prof Anthe Rhoda
Dean: Faculty of Community and Health Sciences
University of the Western Cape
Private Bag X17
Bellville 7535
chs-deansoffice@uwc.ac.za

Oluphando lupasiswe sisigqeba sekomiti yophando iYunivesithi yaseNtshona Koloni kunyene komiti yezemigomo Biomedical Research Ethics (Reference number: BM19/3/15).

Biomedical Research Ethics Committee
University of the Western Cape
Private Bag X17
Bellville
7535
Tel: 021 959 4111
e-mail: research-ethics@uwc.ac.za

APPENDIX 3D:

STUDY CONSENT FORM

UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel : +27 21-959 2760 Fax : 27 21-959

E-mail: erosant@uwc.ac.za

CONSENT FORM

Title of Research Project: **An assessment of the nutritional adequacy and quality of food provided to adult patients in public psychiatric hospitals in the Eastern Cape**

The study has been described to me in language that I understand. My questions about the study have been answered. I understand what my participation will involve, and I agree to participate of my own choice and free will. I understand that my identity will not be disclosed to anyone. I understand that I may withdraw from the study at any time without giving a reason and without fear of negative consequences or loss of benefits.

___ I agree to be **[**videotaped/audiotaped/photographed**]** during my participation in this study.

___ I do not agree to be **[**videotaped/audiotaped/photographed**]** during my participation in this study.

Participant's name……

Participant's signature…….

Date……..

Biomedical Research Ethics Committee

University of the Western Cape

Private Bag X17

Bellville

7535

Tel: 021 959 4111

E-mail: research-ethics@uwc.ac.za

UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel : +27 21-959 2760 Fax : 27 21-959

E-mail: erosant@uwc.ac.za

IPHEPHA LESIXWAYISO

Igama le zifundo - uphando: Inkqhubo yophando malunga nomgangatho wesondlo nezinto ezithi zibenomthelela kubonelelolo kutya kwizigulane ezikwizibhedlela zabo bano phazamiseko lwengqhondo kwiMpumaKoloni.

Uphando luqhutywe ngolwimi endilithethayo nendilaziyo. Imibuzo ngophando iphenduliwe. Ndiyayazi ukuba inxaso yam koluphando imalunga natoni kwaye ndiyavuma ukuba yinxelanye yalo. Ndiyayazi okokuba oluphando soze luveze ukuba ndingubani. Ndiyazi okokuba ndingohlukana noluphando nanini na ndinga nikanga zizathu kwaye ndingoyiki kungcungcuthekiswa noku hlukana namalungelo am.

___ I agree to be **[**audiotaped/photographed**]** during my participation in this study.

___ I do not agree to be [videotaped/audiotaped/photographed**]** during my participation in this study.

Igama ……..

Utyikityo……..

Umhla…….

Biomedical Research Ethics Committee

University of the Western Cape

Private Bag X17

Bellville

7535

Tel: 021 959 4111

E-mail: research-ethics@uwc.ac

APPENDIX 4A:

MENU PROVIDED IN HOSPITAL A

Province of the
EASTERN CAPE
HEALTH

NORMAL DIET							
Morning snack	**Morning snack**	**Morning snack**	**Morning snack**	**Morning snack**	**Morning snack**	**Morning snack**	**Morning snack**
Tea/Coffee Bread	Tea/Coffee Bread	Tea/Coffee Bread	Tea/Coffee Bread	Tea/Coffee Bread	Tea/Coffee Bread	Tea/Coffee Bread	Tea/Coffee Bread
DAY 1	**DAY 2**	**DAY 3**	**DAY 4**	**DAY 5**	**DAY 6**	**DAY 7**	**DAY 8**
BREAKFAST	**BREAKFAST**	**BREAKFAST**	**BREAKFAST**	**BREAKFAST**	**BREAKFAST**	**BREAKFAST**	**BREAKFAST**
Oats Bread Milk Boiled egg Marg Jam Sugar	M/Meal Bread Milk Vienna Marg Jam Sugar	Maltabella Bread Milk Fish Cake Marg Jam Sugar	M/meal Bread Milk Scrambled egg Marg Jam Sugar	Oats Bread Milk Peanut butter Marg Jam Sugar	Maltabella Bread Milk Peanut butter Marg Jam Sugar	M/meal Bread Milk Peanut butter Marg Jam Sugar	Weetbix Bread Milk Cheese Marg Jam Sugar
LUNCH	**LUNCH**	**LUNCH**	**LUNCH**	**LUNCH**	**LUNCH**	**LUNCH**	**LUNCH**
Rice Roast chicken Butternut Green beans Apple	Samp&beans Beef stew Carrots Spinach Fruit/Banana	Rice Beef mince Cabbage Beetroot Fruit/Pear	Mash Battered fish (baked) Butternut Green beans Fruit/Apple	Samp Chicken stew Peas Butternut Fruit/Banana	Stiff pap Diced beef Carrots Beetroot salad Fruit/Pear	Pie/Rice Chicken Stir fry/mixed veg Fruit/Apple	Mash Battered fish Green beans Carrot salad Dessert
SUPER	**SUPER**	**SUPER**	**SUPER**	**SUPER**	**SUPER**	**SUPER**	**SUPER**
Stiff pap Pilchards Mixed veg	Mash Potato Chicken Livers Butternut	Macaroni Pilchard Mixed veg	Rice Savoury mince Carrot	Rice Vienna Green beans	Rice Battered fish Mixed veg	Rice Curry bean stew Butternut	Macaroni Meatballs Spinach
EVENING SNACK	**EVENING SNACK**	**EVENING SNACK**	**EVENING SNACK**	**EVENING SNACK**	**EVENING SNACK**	**EVENING SNACK**	**EVENING SNACK**
Tea Milk Sugar Bread Marg	Tea Milk Sugar Bread Marg	Tea Milk Sugar Bread Marg	Tea Milk Sugar Bread Marg	Tea Milk Sugar Bread Marg	Tea Milk Sugar Bread Marg	Tea Milk Sugar Bread Marg	Tea Milk Sugar Bread Marg

APPENDIX 4B:

MENU PROVIDED IN HOSPITAL B

FOOD SERVICE DEPARTMENT 8 DAY CYCLE MENU NORMAL DIETS

Meal Plan	Cooked								
BREAKFAST	**Ration scale**	**Day 1**	**Day 2**	**Day 3**	**Day 4**	**Day 5**	**Day 6**	**Day 7**	**Day8**
Porridge/cereal	500g/2cups	Maize meal	oats	mabele	Maize meal	oats	mabele	Maize meal	Oats
Protein	50g	cheese	Boiled egg	polony	Peanut butter	Boiled egg	Peanut butter	Fish fingers	Cheese
Bread	4slices bread	bread	bread	bread	bread	bread	bread	bread	bread
Margarine	15g	margarine	margarine	margarine	margarine	margarine	margarine	margarine	margarine
Milk	150ml+50ml	Fresh milk	Fresh milk	Fresh milk	Fresh milk	Fresh milk	Fresh milk	Fresh milk	Fresh milk
Sugar	10g	sugar	sugar	sugar	sugar	sugar	sugar	sugar	sugar
Tea/Coffee	2g	Tea/coffee	Tea/coffee	Tea/coffee	Tea/coffee	Tea/coffee	Tea/coffee	Tea/coffee	Tea/coffee
MID-MORN TEA	Tea=2g,milk=50ml Sugar=10g	Tea,milk,sugar	Tea,milk,sugar	Tea,milk,sugar	Tea,milk,sugar	Tea,milk,sugar	Tea,milk,sugar	Tea,milk,sugar	Tea,milk,sug
LUNCH									
Protein	100g-120(bone)	Chicken stew	Fish(baked)	Stewing beef	Pork chops	Fish(baked)	Mince M(sav)	Roast chicken	Beef stew
Starch	100g	Samp&beans	Savoury rice	Samp(white)	Stiff pap	rice	Samp(white)	Savoury rice	Samp(white)
Veg 1	100g	butternut	Cut beans	Cabbage	butternut	cabbage	Cabbage	beetroot salad	Cabbage
Veg 2	100g		butternut	butternut	coleslaw	butternut	butternut	butternut	Carrot
Gravy/sauce	125g		gravy	gravy	gravy	gravy	gravy	gravy	-
Fruit/ beverage	1med/250ml	juice	juice	fruit	juice	fruit	juice	Jelly +custard	juice
SUPPER									
Protein	90g/200ml(maas)	Mince meat	Amasi/sour milk	Vienna's with gravy	Macaroni & cheese	Mince(savoury)	Vienna's with gravy	Macaroni&cheese	Vienna's stewed
Starch Bread	100g 3slices	Mash potato 3slice bread	Phutu/samp(white)+ 3slices	spaghetti 3slices	3slices	Samp(white) 3 slices	spaghetti 3slices	- 3slices	Spaghetti+ 3slices
Veg 1 Tea,milk,sugar	100g 2g,50ml,10g	Mixed vege Tea,milk,sugar	- Tea,milk,sugar	Country mix Tea,milk,sugar	stir-fry tea,milk,sugar	Carrots(stewed) Tea,milk,sugar	Country mix Tea,milk,sugar	Mixed vege Tea,milk,sugar	Stir fry Tea,milk,sug
NIGHT SNACK									
Bread	4Slices	bread	bread	bread	bread	bread	bread	bread	bread
Breadspread	15g	Peanutb/jam	Peanut/jam	Peanut/jam	Peanut/jam	Peanut/jam	Peanut/jam	Peanut/jam	Peanut
T/C+M &Sugar	2g,50m,15g	Tea/coffee	Tea/coffee	Tea/coffee	Tea/coffee	Tea/coffee	Tea/coffee	Tea/coffee	Tea/coffee

APPENDIX 4C:

MENU PROVIDED IN HOSPITAL C

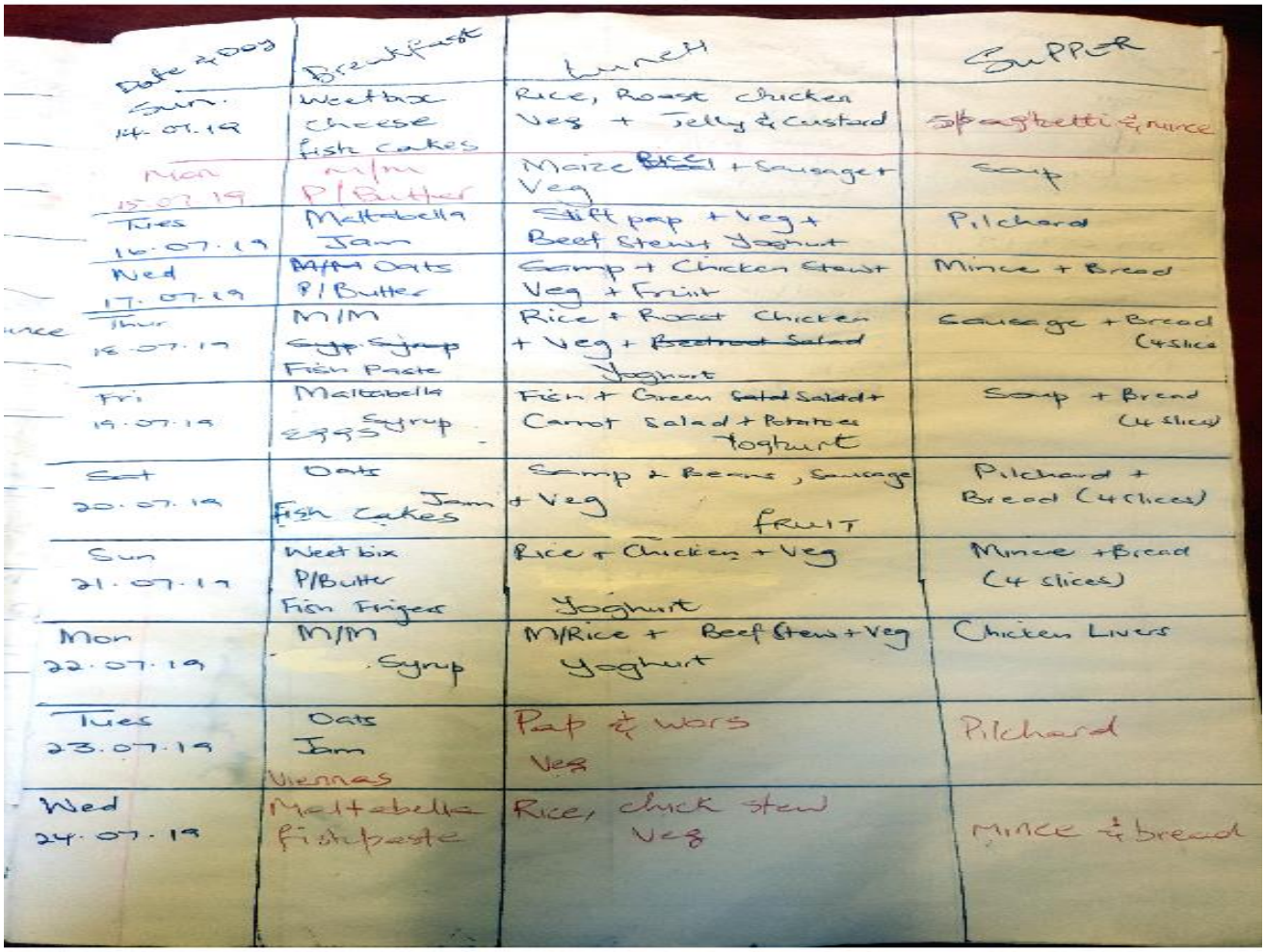
FOOD SERVICE DEPARTMENT 8 AY CYCLIC MENU

PATIENTS NORMAL DIET 2019/2020

Column1	Column2	Column3	Column4	Column5	Column6	Column7	Column8	Column9	Column10
MEAL PLAN									
BREAKFAST	**RATIO SCALE**	**DAY 1**	**DAY 2**	**DAY 3**	**DAY 4**	**DAY 5**	**DAY 6**	**DAY 7**	**DAY 8**
CEREAL /PORRIDGE	100g/90g	OATS	M/MEAL	MALTABELLA	OATS	M/MEAL	MALTABELLA	ALL BRAN	M/MEAL
PROTEIN	50 - 80g	EGGS	C/LIVERS	PILCHARDS	YOGHURT	EGGS	F/CAKES	YOGHURT	PILCHARDS
BREAD	2 SLICES	BREAD	BREAD	BREAD	BREAD	BREAD	BREAD	BREAD	BREAD
MARGARINE	5G	MARG	MARG	MARG	MARG	MARG	MARG	MARG	MARG
MILK	200ML	MILK	MILK	MILK	MILK	MILK	MILK	MILK	MILK
SUGAR	20G	SUGAR	SUGAR	SUGAR	SUGAR	SUGAR	SUGAR	SUGAR	SUGAR
MILO	1.5G	MILO	MILO	MILO	MILO	MILO	MILO	MILO	MILO
SNACK 10 AM									
TEA	1 TEA BAG	1 TEA BAG	1 TEABAG	1 TEABAG	1 TEABAG	1 TEABAG	1 TEABAG	1 TEABAG	1 TEABAG
MILK	100ml	MILK	MILK	MILK	MILK	MILK	MILK	MILK	MILK
SUGAR	10G	SUGAR	SUGAR	SUGAR	SUGAR	SUGAR	SUGAR	SUGAR	SUGAR
LUNCH									
PROTEIN	100- 150G	BEEF/STEW	ROAST CHICKEN	B/BRISKET	C/STEW	PORK	BEEF STEW	ROAST CHICKEN	BUTTERED FISH
STARCH	100g	SAMP&BEANS	RICE	WHITE SAMP	RICE	MASH	SAMP&BEANS	RICE	MASH
VEGE 1	40G	PUMPKIN	CARROTS	BUTTERNUT	CARROTS	BEETROOT	BUTTERNUT	BEETROOT	PEAS
VEGE 2	40G	BROCCOLLI	GREEN BEANS	CABBAGE	BROCCOLLI	COLESLAW	G/ BEANZ	COLESLAW	BUTTERNUT
FRUIT/BEVERAGE	90g/250ml	FRUIT	JUICE	FRUIT	FRUIT	JUICE	FRUIT	DESSERT	FRUIT
SNACK 3PM									
TEA	1 TEABAG	TEA	TEA	TEATEA	TEA	TEA	TEA	TEA	TEA
MILK	100ml	MILK	MILK	MILK	MILK	MILK	MILK	MILK	MILK
SUGAR	10G	SUGAR	SUGAR	SUGAR	SUGAR	SUGAR	SUGAR	SUGAR	SUGAR
SUPPER									
PROTEIN	100-150G	CHEESE	MINCE	MEATBALLS	PILCHARDS	M/BALLS	C/DRUMS	COTTAGE PIE	C/LIVERS
STARCH	100g	MACARONI	MASH	RICE	MACARONI	RICE	RICE		RICE
VEGE 1	40G	PEAS	GEMSQUASH	MIXED VEGE	PEAS	BEAN	GEMS	CARROTS	MIXED VEGE
NIGHT SNACK	100G								
PROT/ BREAD	2 SLICES								

APPENDIX 4D:

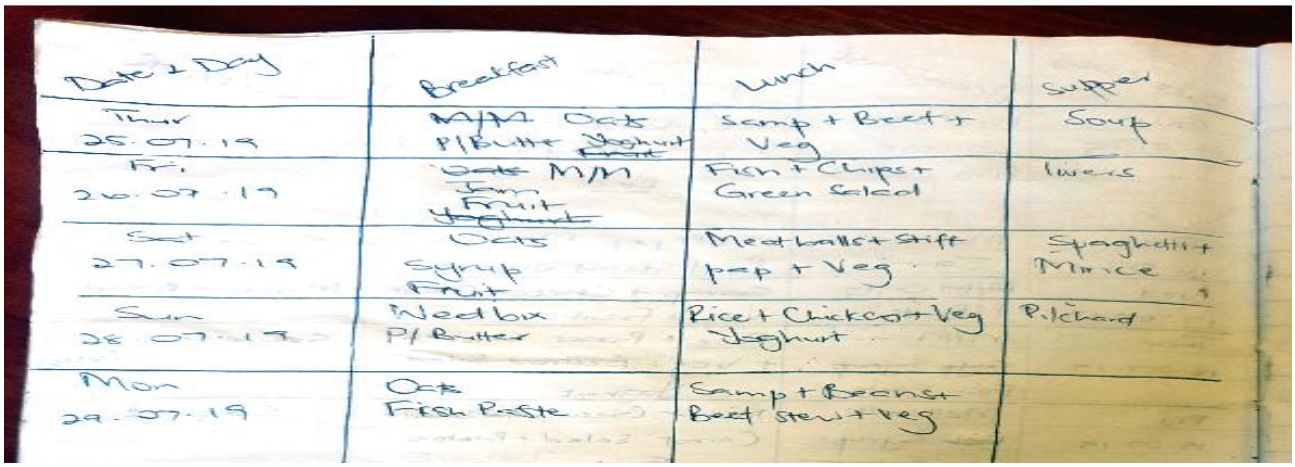
MENU PROVIDED IN HOSPITAL D



Date 2009	Breakfast	Lunch	Supper
Sun. 14.07.19	Weetbix Cheese Fish cakes	Rice, Roast chicken Veg + Jelly & Custard	Spaghetti & mince
Mon 15.07.19	M/M P/Butter	Maize ~~Rice~~ + Sausage + Veg	Soup
Tues 16.07.19	Maltabella Jam	Stiff pap + Veg + Beef Stew + Yoghurt	Pilchard
Wed 17.07.19	~~M/M~~ Oats P/Butter	Samp + Chicken Stew Veg + Fruit	Mince + Bread
Thur 18.07.19	M/M ~~Syrup~~ Fish Paste	Rice + Roast Chicken + Veg + ~~Beetroot Salad~~ Yoghurt	Sausage + Bread (4 slice
Fri 19.07.19	Maltabella Eggs Syrup	Fish + Green ~~Salad~~ Salad + Carrot Salad + Potatoes Yoghurt	Soup + Bread (4 slices)
Sat 20.07.19	Oats Jam Fish Cakes	Samp & Beans, Sausage + Veg FRUIT	Pilchard + Bread (4 slices)
Sun 21.07.19	Weet bix P/Butter Fish Frigex	Rice + Chicken + Veg Yoghurt	Mince + Bread (4 slices)
Mon 22.07.19	M/M Syrup	M/Rice + Beef Stew + Veg Yoghurt	Chicken Livers
Tues 23.07.19	Oats Jam Viennas	Pap & wors Veg	Pilchard
Wed 24.07.19	Maltabella fishpaste	Rice, chick stew Veg	Mince & bread

APPENDIX 4D:

MENU PROVIDED IN HOSPITAL D



Date & Day	Breakfast	Lunch	Supper
Thur 25.07.19	~~M/M~~ Oats P/Butter ~~Yoghurt Fruit~~	Samp + Beef + Veg	Soup
Fri. 26.07.19	~~Oats~~ M/M ~~Jam Fruit Yoghurt~~	Fish + Chips + Green Salad	livers
Sat 27.07.19	Oats Syrup Fruit	Meatballs + Stiff pap + Veg	Spaghetti + Mince
Sun 28.07.19	Weetbix P/Butter	Rice + Chicken + Veg Yoghurt	P/Chard
Mon 29.07.19	Oats Fish Paste	Samp + ~~Beans~~ Beef stew + Veg	

APPENDIX 5:

EXAMPLES OF THAWING METHODS USED IN THE FOUR HOSPITALS

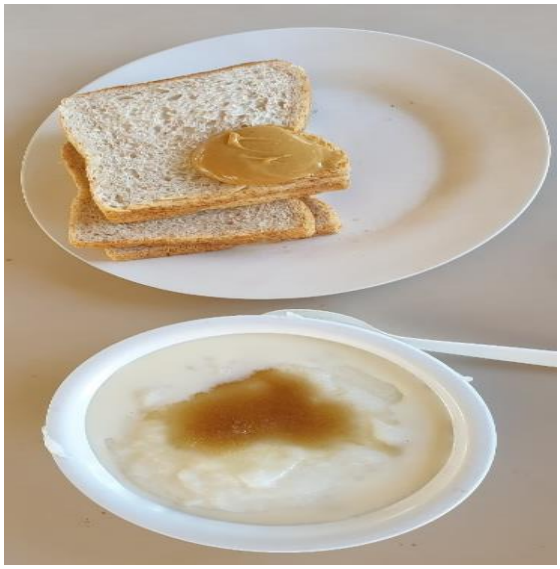
Image 1: Defrosting chicken livers (Hospital A)

Image 2: Defrosting frozen brisket (beef) (Hospital D)

Image 3: Defrosting beef mince (Hospital B)

APPENDIX 6A:

EXAMPLES OF PRESENTATION OF PATIENT FOOD IN THE FOUR HOSPITALS (BREAKFAST)



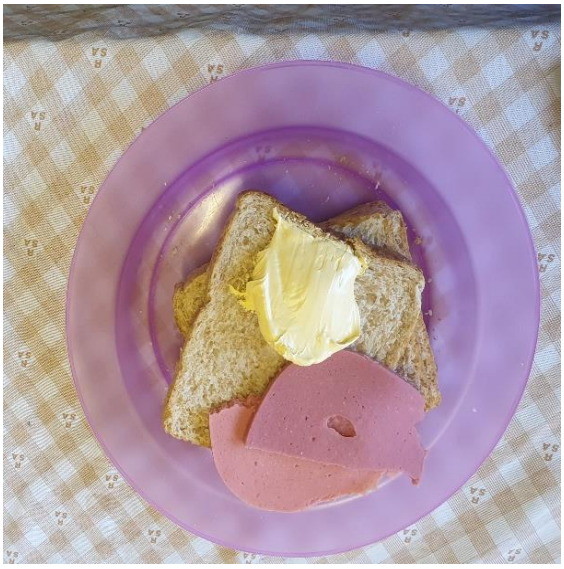


Image 4: Hospital A Image 5: Hospital B

Image 6: Hospital C Image 7: Hospital D

APPENDIX 6B:

EXAMPLES OF PRESENTATION OF PATIENT FOOD IN THE FOUR HOSPITALS (LUNCH)

Image 8: Hospital A

Image 9: Hospital B

Image 10: Hospital C

Image 11: Hospital D

APPENDIX 6C:

EXAMPLES OF PRESENTATION OF PATIENT FOOD IN THE FOUR HOSPITALS (SUPPER)

Image 12: Hospital A

Image 13: Hospital B

Image 14: Hospital C

Image 15: Hospital D

APPENDIX 6D:

EXAMPLES OF BEVERAGES PROVIDED IN THREE OF THE FOUR HOSPITALS

Image 16: Hospital B Image 17: Hospital C

Image 18: Hospital D

APPENDIX 6E:

EXAMPLES OF ADDITIONAL FAT AND SUGAR ADDED IN THE FOUR HOSPITALS

Image 19: Hospital D

Image 20: Hospital B

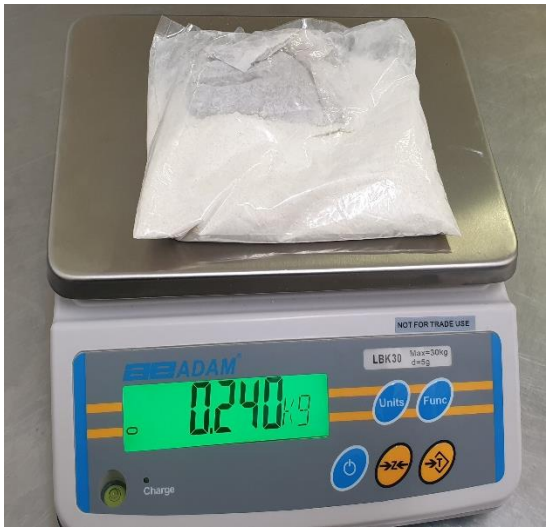


Image 21: Hospital D

Image 22: Hospital C

APPENDIX 7:

EXAMPLES OF FOOD DELIVERY METHODS IN THE FOUR HOSPITALS

Image 23: Hospitals A and B Image 24: Hospital C

Image 25: Hospital D

APPENDIX 8:

EXAMPLES OF SERVING UTENSILS USED INTHE FOUR HOSPITALS

Image 26: Hospital A

Image 27: Hospital A

Image 28: Hospital A

Image 29: Hospitals B, C and D

APPENDIX 9:

EXAMPLES OF STORAGE FACILITIES IN THE FOUR HOSPITALS

Image 30: Hospital A

Image 31: Hospital A

Image 32: Hospital B

Image 33: Hospital C

Image 34: Hospital D

Image 35: Hospital D

APPENDIX 10:

EXAMPLES OF ABLUTION ROOMS AND HAND HYGIENE INFRASTRUCTURE

Image 36: Hospital A Image 37: Hospital B

Image 38: Hospital C Image 39: Hospital D

APPENDIX 11:

EXAMPLES OF TABLECLOTHS IN THE WARD KITCHENS AND FSUs IN THE FOUR HOSPITALS

Image 40: Hospital A ward kitchen

Image 41: Hospital B ward kitchen

APPENDIX 12:

HAND-CUT VEGETABLES IN TWO OF THE FOUR HOSPITALS

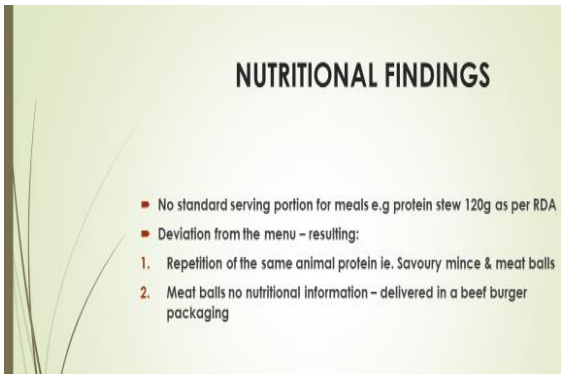
Image 42: Hospital C

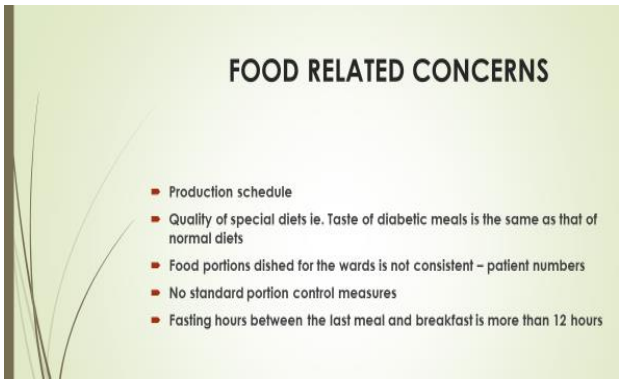
Image 43: Hospital D

APPENDIX 13A:

PRELIMINARY FEEDBACK TO THE PARTICIPATING HOSPITALS

As indicated in the methodology section of this work, participating hospitals were provided with feedback following the conclusion of the plate-waste study in each hospital. Two of the four hospitals were provided with a PowerPoint presentation and copies of the presentations were shared with the respective hospital officers on request. In these two hospitals, senior management attended the presentations and suggestions were made regarding possible changes that could be effected in an effort to improve the standard of hospital food and prioritise patient food safety.





Ward Level – Food Compliance

- No temperature file
- No food thermometers
- Wearing of protective clothing when dishing
- Sanitiser for crockery and cutlery

Dishing

- Inadequate portion sizes
- Incorrect dishing utensils
- Results to shortage of food
- Bread not spread by the responsible personnel
- High food waste – left overs porridge - female

Supply Chain

- Clear food specifications
- Strict measures during receiving at FSU
- Specifications committee to relook food specs

1. Temperature and hygiene of delivery trucks

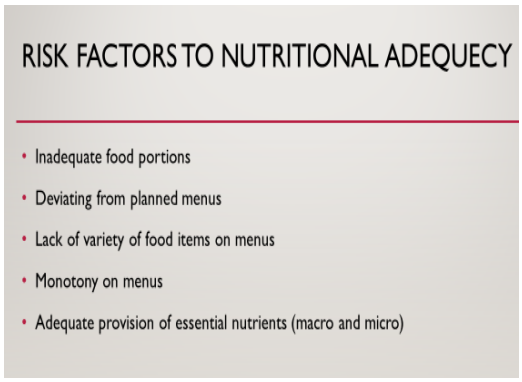
- Strict with suppliers - prevent shortages before the end of the contract
- Contract management

Continue….

PRODUCTION SCHEDULE

APPENDIX 13B:

PRELIMINARY FEEDBACK ON HOSPITALS B AND D



APPENDIX 14:

PLATE-WASTE FORMS FOR THREE HOSPITALS

HOSPITAL A: DAY 1

FEMALE WARD

Food item	**Served weight (Days 1-3) (5 samples)**					**Average per day (g/kg/ml)**	**A: Served weight of portion (g)** (25 plates/number per ward)	**B: Wasted food (g)**	**C: Actual intake (g)**
Early morning tea (**N**ONE) **(05h00 – 06h00) No early morning snack (only diabetics and patients on ARVs are catered for)**									
Breakfast **(08h00) Breakfast served between 08h30 and 09h00 (protein only served to high protein)**									
Mabele with mealie meal	510g	460g	455g	505g	470g				
Milk	45ml	40ml	35ml	45ml	50ml				
Slices of brown bread	2	2	2	2	2				
Margarine	15g	15g	15g	15g	15g				
Tea with milk and sugar	250ml	250ml	250ml	250ml	250ml				
Sugar	40g	40g	40g	40g	40g				
UNDISHED									
Mabele	4.630kg								
WASTE AFTER CONSUMPTION									
Mabele	2.000kg								
Snack **(10h00) No snack is served for normal and diabetic patients**									
Lunch **(12h00) Lunch is served between 12h00 and 12h30**									
Savoury mince	180g	125g	165g	110g	150g				
White rice	250g	210g	200g	210g	205g				
Steamed butternut	80g	90g	85g	80g	90g				
UNDISHED									
Savoury mince	625g								
Rice	1.775kg								
Butternut	560g								
WASTE AFTER CONSUMPTION									
Savoury mince	1.345kg								
Rice	1.555kg								
Butternut	1.635								
Afternoon snack **(15h00) Afternoon snack is not served**									
Supper									
Meat balls with gravy	65g	60g	55g	65g	60g				

Macaroni	225g	200g	205g	180g	195g				
Tea with milk	47ml	47ml	47ml	47ml	47ml				
Sugar	40g	40g	40g	40g	40g				
WASTE AFTER CONSUMPTION									
Meat balls	95g								
Macaroni	1.554kg								
Late night snack									
Bread slices	2	2	2	2	2				
Butter/margarine	15g	20g	25g	15g	17g				

HOSPITAL A: DAY 2

FEMALE WARD

Food item	Served weight (Days 1-3) (5 samples)					Average per day (g/kg/ml)	A: Served weight of portion (g) (25 plates/number per ward)	B: Wasted food (g)	C: Actual intake (g)
Early morning tea **(05h00 – 6h00) No early morning snack**									
Breakfast **(08h00) Breakfast served between 8h30 and 9h30**									
Oats	220g	360g	390g	315g	355g				
Milk	47ml	47ml	40ml	45ml	50ml				
Boiled medium egg	1	1	1	1	1				
Bread brown slices	2	2	2	2	2				
Tea with milk	47ml	47ml	47ml	47ml	47ml				
Sugar	40g	40g	40g	40g	40g				
UNDISHED									
Oats	7.150kg								
WASTE AFTER CONSUMPTION									
Oats	2.400kg								
Snack **(10h00) No snack is served for normal and diabetic patients**									
Lunch **(12h00) Lunch is served between 12h00 and 12h30**									
Beef stew	185g	170g	160g	165g	140g				
Samp and beans	305g	300g	310g	290g	300g				
Cabbage	75g	80g	85g	95g	100g				
WASTE AFTER CONSUMPTION – UNDISHED									
Beef stew	0								
Samp and beans	1.700kg								
Cabbage	285g								
WASTE AFTER CONSUMPTION									
Samp and beans	3.00kg								
Cabbage	420g								
Afternoon snack **(15h00) Afternoon snack is not served**									
Supper									
Chicken liver	220g	235g	215g	182g	185g				
Rice	290g	295g	260g	180g	185g				
UNDISHED									
Rice	385g								
WASTE AFTER CONSUMPTION									
Rice	1.300kg								
Late night snack									

Bread brown slices	2	2	2	2	2				
Butter/margarine	15g	19g	25g	20g	18g				

HOSPITAL A: DAY 3

FEMALE WARD

Food item	Served weight (Days 1-3) (5 samples)					Average per day (g/kg/ml)	A: Served weight of portion (g) (25 plates/number per ward)	B: Wasted food (g)	C: Actual intake (g)
Early morning tea **(05h00 – 06h00) No early morning snack**									
Breakfast **(08h00) Breakfast served at 09h30**									
Maize meal porridge	523g	530 g	530 g	560 g	555g				
Milk	47ml	47ml	40ml	45ml	50ml				
Bread brown slices	2	2	2	2	2				
Tea with milk	47ml	47ml	47ml	47ml	47ml				
Sugar	16g	16g	16g	16g	16g				
Sugar	40g	40g	40g	40g	40g				
Margarine	20g	15g	21g	15g	17				
UNDISHED									
Maize meal	1.460kg								
WASTE AFTER CONSUMPTION									
Maize meal	4.590kg								
Snack **(10h00) No snack is served for normal and diabetic patients**									
Lunch **(12h00) Lunch is served between 12h00 and 12h30**									
Sausage stew	228g	120 g	110 g	100 g	95g				
Stiff pap	590g	605 g	645 g	502 g	510g				
Butternut	75g	55g	80g	95g	100g				
WASTE AFTER CONSUMPTION – UNDISHED									
Stiff pap	3.253kg								
WASTE AFTER CONSUMPTION									
Sausage stew	605g								
Stiff pap	2.105kg								
Butternut	1.275kg								
Afternoon snack **(15h00) Afternoon snack is not served**									
Supper									
Pilchard stew	150g	140 g	140 g	135 g	105g				
Macaroni	325g	325 g	280 g	290 g	285g				
UNDISHED									

Macaroni	445g								
WASTE AFTER CONSUMPTION									
Pilchard stew	155g								
Macaroni	1.515kg								
Late night snack									
Bread brown slices	2	2	2	2	2				
Butter/margarine	15g	19g	25g	20g	18g				

HOSPITAL A: DAY 1

MALE WARD 6

Food item	Served weight (Days 1-3) (5 samples)					Average per day (g/kg/ml)	A: Served weight of portion (g) (25 plates/number per ward)	B: Wasted food (g)	C: Actual intake (g)
Early morning tea **(05h00 – 6h00) No early morning snack**									
Breakfast **(08h00) Breakfast served at 09h30**									
Mabele with mealie meal	374g	370g	390g	300g	295g				
Milk	33ml	30ml	33ml	30ml	33ml				
Bread brown slices	4	4	4	4	4				
Tea with milk	250ml	250ml	250ml	250ml	250ml				
Sugar	16g	16g	16g	16g	16g				
Milk	33ml	33ml	33ml	33ml	33ml				
Sugar	40g	40g	40g	40g	40g				
Margarine	20g	20g	20g	21g	24g				
UNDISHED									
Maize meal	0								
WASTE AFTER CONSUMPTION									
Maize meal	0								
Snack **(10h00) No snack is served for normal and diabetic patients**									
Lunch **(12h00) Lunch is served between 12h00 and 12h30**									
Savoury mince	255g	250g	225g	200g	185g				
White rice	210g	120g	133g	95g	90g				
Butternut steamed	90g	95g	88g	70g	65g				
WASTE AFTER CONSUMPTION – UNDISHED									
WASTE AFTER CONSUMPTION									
Afternoon snack **(15h00) Afternoon snack is not served**									
Supper									
Meat balls with gravy	65g	65g	60g	63g	65g				
Macaroni	130g	135g	120g	100g	105g				
UNDISHED									
Macaroni	0								
WASTE AFTER CONSUMPTION									

Late night snack									
Bread brown slices	2	2	2	2	2				
Jam	20g	20g	20g	20g	20g				
Sugar	16g	16g	16g	16g	16g				

HOSPITAL A: DAY 2

MALE WARD 6

Food item	Served weight (Days 1-3) (5 samples)					Average per day (g/kg/ml)	A: Served weight of portion (g) 25 plates/number per ward)	B: Wasted food (g)	C: Actual intake (g)
Early morning tea (05h00 – 06h00) No early morning snack									
Breakfast (08h00) Breakfast served at 09h30									
Oats	470ml	455ml	505ml	415ml	475ml				
Milk	33ml	30ml	33ml	30ml	33ml				
Bread brown slices	4	4	4	4	4				
Boiled egg medium	1	1	1	1	1				
Tea with milk	250ml	250ml	250ml	250ml	250ml				
Sugar	16g	16g	16g	16g	16g				
Milk	33ml	33ml	33ml	33ml	33ml				
Sugar oats	40g	40g	40g	40g	40g				
Margarine	20g	20g	20g	21g	24g				
UNDISHED									
WASTE AFTER CONSUMPTION									
Snack (10h00) No snack is served for normal and diabetic patients									
Lunch (12h00) Lunch is served between 12h00 and 12h30									
Beef stew	120g	125g	100g	105g	95g				
Samp and beans	265g	286g	3540g	200g	180g				
Cabbage steamed	45g	47g	40	50g	65g				
WASTE AFTER CONSUMPTION – UNDISHED									
WASTE AFTER CONSUMPTION									
Afternoon snack (15h00) Afternoon snack is not served									
Supper									
Chicken liver with gravy	210g	190g	200g	175g	100g				
White rice	235g	200g	180g	180g	155g				
UNDISHED									
WASTE AFTER CONSUMPTION									
Late night snack									
Bread brown slices	2	2	2	2	2				
Peanut butter	20g	20g	20g	20g	20g				

Sugar	16g	16g	16g	16g	16g				

HOSPITAL A: DAY 3

MALE WARD 6

Food item	**Served weight (Days 1-3) (5 samples)**					**Average per day (g/kg/ml)**	**A: Served weight of portion (g)** (25 plates/number per ward)	**B: Wasted food (g)**	**C: Actual intake (g)**
Early morning tea **(05h00 – 06h00) No early morning snack**									
Breakfast **(08h00) Breakfast served at 09h30**									
Maize meal porridge	370g	395g	420g	465g	340g				
Milk	33ml	30ml	33ml	30ml	33ml				
Bread brown slices	4	4	4	4	4				
Tea with milk	250ml	250ml	250ml	250ml	250ml				
Milk	33ml	33ml	33ml	33ml	33ml				
Sugar	40g	40g	40g	40g	40g				
Margarine	20g	20g	20g	21g	24g				
UNDISHED									
WASTE AFTER CONSUMPTION									
Snack **(10h00) No snack is served for normal and diabetic patients**									
Lunch **(12h00) Lunch is served at 12h40**									
Sausage stew	180g	200g	170g	130g	125g				
Stiff pap	415g	350g	435g	370g	355g				
Pumpkin	55g	65g	65g	75g	90g				
WASTE AFTER CONSUMPTION – UNDISHED									
WASTE AFTER CONSUMPTION									
Pumpkin	830g								
Afternoon snack **(15h00) Afternoon snack is not served**									
Supper									
Pilchard stew	185g	160g	190g	155g	138g				
Macaroni	240g	225g	225g	200g	185g				
UNDISHED									
Macaroni	0								
WASTE AFTER CONSUMPTION									

Late night snack									
Bread brown slices	2	2	2	2	2				
Margarine	20g	20g	20g	20g	20g				
Tea with milk	250ml	250ml	250ml	250ml	250ml				
Milk	33ml	33ml	33ml	33ml	33ml				
Sugar	16g	16g	16g	16g	16g				

HOSPITAL C: DAY 1

FEMALE WARD

Food item	Served weight (Days 1-3) (5 samples)					Average per day (g/kg/ml)	A: Served weight of portion (g) (25 plates/number per ward)	B: Wasted food (g)	C: Actual intake (g)
Early morning tea **(05h00 – 06h00) No early morning snack**									
Breakfast **(08h00) Breakfast served between 08h00 and 09h00**									
Maize meal porridge with milk	540g	440g	445g	445g	470g				
Pilchard stew	100g	95g	90g	100g	100g				
Bread slices	2	2	2	2	2				
Tea with milk and sugar	85ml	90ml	110ml	85ml	90ml				
Sugar	24g	24g	24g	24g	24g				
Snack **(10h00) No snack is served for normal and diabetic patients**									
Lunch **(12h00) Lunch is served between 12h00 and 12h30**									
Chicken stew (Drumsticks)	95g	70g	85g	90g	79g				
White rice	205g	150g	140g	170g	150g				
Carrot	100g	90g	85g	72g	93g				
Broccoli	45g	25g	38g	40g	27g				
Orange	1	1	1	1	1				
WASTE AFTER CONSUMPTION									
Chicken stew	350g bones								
White rice	1.675g								
Carrot	780g								
Broccoli	195g								
Afternoon snack **(15h00) Afternoon snack is served at 14h00**									
Tea with milk	50ml	50ml	55ml	85ml	65ml				
Sugar	6g	6g	6g	6g	6g				
Supper									
Pilchard stew	70g	100g	90g	85g	75g				
Macaroni	380g	280g	385g	255g	490g				
Peas	70g	70g	65g	70g	55g				
WASTE AFTER CONSUMPTION									
Pilchard stew	475g								
Macaroni	685g								

Peas	470g								
Late night snack									
Bread slices	2	2	2	2	2				
Butter/margarine	15g	15g	15g	15g	15g				

HOSPITAL C: DAY 2

FEMALE WARD

Food item	**Served weight (Days 1-3)** **(5 samples)**					**Average per** day **(g/kg/ml)**	**A:** **Served weight of portion (g)** (25 plates/number per ward)	**B:** **Wasted food (g)**	**C:** **Actual intake (g)**
Early morning tea **(05h00 – 06h00) No early morning snack**									
Breakfast **(08h00) Breakfast served between 08h00 and 09h00**									
Maize meal porridge with milk	540g	440g	445g	445g	470g				
Milk (porridge)	85ml	80ml	80ml	90ml	85ml				
Pilchard stew	100g	95g	90g	100g	100g				
Bread slices	2	2	2	2	2				
Tea with milk and sugar	75ml	75ml	70ml	70ml	70ml				
Sugar	24g	24g	24g	24g	24g				
Snack **(10h00) No snack is served for normal and diabetic patients**									
Lunch **(12h00) Lunch is served between 12h00 and 12h30**									
Chicken stew (drumsticks)	70g	70g	85g	79g	93g				
White rice	1505g	150g	165g	164g	155g				
Carrot	90g	90g	85g	72g	100g				
Broccoli	45g	40	42g	40g	48g				
Orange	1	1	1	1	1				
WASTE AFTER CONSUMPTION									
Chicken stew	430g bones								
White rice	0g								
Carrots	0g								
Broccoli	0								
Afternoon snack **(15h00) Afternoon snack is served at 14h00**									
Tea with milk	50ml	50ml	55ml	85ml	65ml				
Sugar	6g	6g	6g	6g	6g				
Supper									
Pilchard stew	100g	120g	110g	100g	135g				
Macaroni	200g	210g	250g	225g	228g				
Peas	70g	70g	75	70g	80g				
WASTE AFTER CONSUMPTION – UNDISHED									

Pilchard stew	1.385kg								
Macaroni	0								
Peas	385g								
Late night snack									
Bread slices	2	2	2	2	2				
Butter/margarine	15g	15g	15g	15g	15g				

HOSPITAL C: DAY 3

FEMALE WARD

Food item	Served weight (Day 1-3) (5 samples)					Average per day (g/kg/ml)	A: Served weight of portion (g) (25 plates/number per ward)	B: Wasted food (g)	C: Actual intake (g)
Early morning tea **(05h00 – 06h00) No early morning snack**									
Breakfast **(08h00) Breakfast served between 08h00 and 08h30**									
Oats	540g	440g	445g	445g	470g				
Milk	45ml	50ml	55ml	40ml	50ml				
Boiled medium egg	1	1	1	1	1				
Bread slices	2	2	2	2	2				
Tea with milk and sugar	200ml	200ml	200ml	200ml	200ml				
Sugar	24g	24g	24g	24g	24g				
Snack **(10h00) No snack is served for normal and diabetic patients**									
Lunch **(12h00) Lunch is served at 12h30**									
Pork stew with bones in	165g	160g	170g	155g	168g				
Mashed potato	330g	325g	330g	329g	321g				
Beetroot salad	85g	90g	85g	90g	93g				
Cabbage with mayonnaise	70g	73g	71g	75g	82g				
Quava juice (20% guava nector)	150ml	150ml	185ml	180ml	155ml				
UNDISHED									
Mashed potatoes	795g								
Cabbage with mayonnaise	715g								
Beetroot salad	560g								
Juice	2 L	(Reason for not dishing was that it would be left for admitted patients)							
WASTE AFTER CONSUMPTION									
Pork stew	320g bones								
Potatoes	1.385kg								
Cabbage	380g								
Beetroot	390g								

Afternoon snack **(15h00) Afternoon snack is served at 14h00**									
Juice	250ml	285ml	300ml	260ml	245ml				
Supper									
Meat balls with gravy	130g	110g	115g	95g	90g				
White rice	260g	260g	285g	260g	280g				
Bean salad	85g	80g	95g	80g	100g				
WASTE AFTER CONSUMPTION									
Meat balls	0								
Rice	900g								
Bean salad	160g								
Late night snack									
Bread slices	2	2	2	2	2				
Peanut butter	20g	20g	20g	20g	20g				

HOSPITAL C: DAY 1

MALE WARD

Food item	Served weight (Days 1-3) (5 samples)					Average per day (g/kg/ml)	A: Served weight of portion (g) (25 plates/number per ward)	B: Wasted food (g)	C: Actual intake (g)
Early morning tea **(05h00 – 06h00) No early morning snack**									
Breakfast **(08h00) Breakfast served between 08h00 and 09h00**									
Oats	585g	560g	525g	530g	475g				
Milk	85ml	80ml	85ml	85ml	80ml				
Boiled medium egg	1	1	1	1	1				
Bread slices	3	3	3	3	3				
Tea with milk and sugar	180ml	180ml	195ml	200ml	210ml				
Sugar	24g	24g	24g	24g	24g				
Snack **(10h00) No snack is served for normal and diabetic patients**									
Lunch **(12h00) Lunch is served between 12h00 and 12h30**									
Pork stew	155g	170g	160g	100g	105g				
Mashed potatoes	345g	340g	355g	345g	360g				
Beetroot salad	75g	75g	85g	70g	92g				
Cabbage with mayonnaise	110g	115g	105g	90g	112g				
Guava juice (20% guava nector)	150ml	150ml	150ml	150ml	150ml				
WASTE AFTER CONSUMPTION – UNDISHED									
Mash potato	950g								
Cabbage salad	470g								
Bean salad	430g								
Afternoon snack **(15h00) Afternoon snack is served at 14h00**									
Tea with milk	50ml	50ml	55ml	85ml	65ml				
Sugar	6g	6g	6g	6g	6g				
Supper									
Meat balls with gravy	130g	120g	65g	60g	65g				
White rice	230g	240g	250g	250g	230g				
Bean salad	100g	90g	105g	110g	85g				
WASTE AFTER CONSUMPTION									
Meat balls	0								

White rice	0								
Bean salad	0								
Late night snack									
Bread slices	2	2	2	2	2				
Peanut butter	20g	20g	20g	20g	20g				

HOSPITAL C: DAY 2

MALE WARD

Food item	Served weight (Days 1-3) (5 samples)					Average per day (g/kg/ml)	A: Served weight of portion (g) (25 plates/number per ward)	B: Wasted food (g)	C: Actual intake (g)
Early morning tea **(05h00 – 06h00) No early morning snack**									
Breakfast **(08h00) Breakfast served between 8h00 and 8h30**									
Amabele	580g	510g	610g	460g	580g				
Milk	85ml	85ml	85ml	85ml	85ml				
Chicken liver with gravy	70g	70g	85g	55g	50g				
Bread slices	2	2	2	2	2				
Tea with milk and sugar	45ml	45ml	45ml	45ml	45ml				
Sugar	24g	24g	24g	24g	24g				
Snack **(10h00) No snack is served for normal and diabetic patients**									
Lunch **(12h00) Lunch is served between 12h00 and 12h30**									
Lean beef stew	135g	120g	100g	105g	115g				
Samp and beans	355g	400g	500g	395g	260g				
Butternut	100g	105g	80g	75g	70g				
Banana	75g	75g	70g	73g	75g				
WASTE AFTER CONSUMPTION – UNDISHED									
Beef stew	500g								
Samp and beans	470g								
Butternut	490g								
Afternoon snack **(15h00) Afternoon snack is served at 14h00**									
Tea	180ml	185ml	180ml	190ml	195ml				
Milk	45ml	45ml	45ml	45ml	45ml				
Supper									
Chicken drumstick (stew)	75g	80g	75g	75g	89g				
Rice	240g	235g	200g	180g	155g				
Carrots	90g	85g	88g	100g	105g				
WASTE AFTER CONSUMPTION – UNDISHED									
WASTE AFTER CONSUMPTION									
Bones	405g								
Rice	875g								
Carrots	2.505kg								

DISHED AS EXTRA TO 9 PATIENTS									
Late night snack									
Bread slices	2	2	2	2	2				
Butter/margarine	19g	15g	21g	20g	17g				
Tea with milk	185g	190g	180g	190g	185g				
Sugar	12g	12g	12g	12g	12g				

HOSPITAL C: DAY 3

MALE WARD

Food item	**Served weight (Days 1-3) (5 samples)**					**Average per day (g/kg/ml)**	**A: Served weight of portion (g)** (25 plates/number per ward)	**B: Wasted food (g)**	**C: Actual intake (g)**
Early morning tea **(05h00 – 06h00) No early morning snack**									
Breakfast **(08h00) Breakfast served between 08h00 and 09h00**									
Amabele	310g	285g	385g	360g	380g				
Milk	50ml	55ml	40ml	45ml	50ml				
Chicken liver	75g	55g	100g	115g	115g				
Bread	2	2	2	2	2				
Tea with milk and	185ml	180ml	165ml	170ml	190ml				
Sugar	24g	24g	24g	24g	24g				
Snack **(10h00) No snack is served for normal and diabetic patients**									
Lunch **(12h00) Lunch is served between 12h00 and 12h30**									
Lean beef stew	200g	190g	210g	205g	220g				
Samp and beans	355g	405g	475g	365g	450g				
Butternut	80g	85g	110g	95g	105g				
Banana	70g	75g	75g	75g	71g				
WASTE AFTER CONSUMPTION									
Lean beef stew	380g								
Samp and beans	2.035kg								
Butternut	600g								
Afternoon snack **(15h00) Afternoon snack is served at 14h00** (to accommodate the nursing programme that is scheduled for patients)									
Tea with milk	150ml	185ml	180ml	175ml	190ml				
Sugar	12g	12g	12g	12g	12g				
Supper									
Chicken drumstick stew	75g	70g	85g	70g	70g				
White rice	225g	190g	205g	190g	170g				
Carrots	110g	90g	115g	105g	115g				
WASTE AFTER CONSUMPTION									
Chicken drumstick stew	Bones: 370g								
White rice	1.950kg								
Carrots	1.005kg								
UNDISHED									
Carrots	2.100kg								
Late night snack									

Bread slices	2	2	2	2	2				
Jam	20g	17g	20g	15g	20g				

HOSPITAL D: DAY 1

FEMALE AND FEMALE WARD (PLATING SYSTEM)

Food item	**Served weight (Days 1-3) (5 samples)**					**Average per day (g/kg/ml)**	**A: Served weight of portion (g)** (25 plates/number per ward)	**B: Wasted food (g)**	**C: Actual intake (g)**
Early morning tea (05h00 – 06h00)									
Slices of brown bread with butter	2	2	2	2	2				
Tea with milk and sugar	250ml	250ml	250ml	250ml	250ml				
Breakfast (08h00) Breakfast served between 08h00 and 08h30									
Oats	375g	355g	395g	350g	390g				
Milk	59ml	59ml	59ml	59ml	59ml				
Bread slices	2	2	2	2	2				
Viennas x 2	75g	85g	80g	75g	80g				
Tea with milk and sugar	250ml	250ml	250ml	250ml	250ml				
Milk powder and sugar mix	37g	37g	37g	37g	37g				
Sugar	23.5g	25.5g	23.5g	23.5g	23.5g				
Snack (10h00) No snack is served for normal and diabetic patients									
Lunch (12h00) Lunch is served between 12h00 and 12h30									
Beef sausage	85g	85g	80g	95g	85g				
Stiff pap	235g	335g	305g	335g	260g				
Gem squash	75g	75g	60g	80g	65g				
Cabbage and spinach mix	80g	75g	80g	90g	85g				
WASTE AFTER CONSUMPTION									
Stiff pap	455g								
Cabbage and spinach mix	75g								
Gem squash	195g								
Gem squash pills	280g								
Afternoon snack (14h30) Afternoon snack is served at 14h00									
Brown bread slices	2	2	2	2	2				
Butter	8g	8g	8g	8g	8g				
Tea with milk powder	250ml	250ml	250ml	250ml	250ml				
Milk powder and sugar mix	37g	37g	37g	37g	37g				
Orange	250g	275g	260g	265g	275g				
Supper									

Pilchard stew	275g	270g	300g	275g	250g				
Brown bread slices	2	2	2	2	2				
WASTE AFTER CONSUMPTION									
Pilchard stew	865g								
Late night snack (20h00)									
Bread slices	2	2	2	2	2				
Jam	8g	8g	8g	8g	5g				
Tea with milk powder and sugar	250ml	250ml	250ml	250ml	250ml				

HOSPITAL D: DAY 2

FEMALE AND FEMALE WARD (PLATING SYSTEM)

Food item	**Served weight (Days 1-3) (5 samples)**					**Average per day (g/kg/ml)**	**A: Served weight of portion (g)** (25 plates/number per ward)	**B: Wasted food (g)**	**C: Actual intake (g)**
Early morning tea (05h00 – 06h00)									
Brown bread slices with butter	2	2	2	2	2				
Tea with milk and sugar	250ml	250ml	250ml	250ml	250ml				
Breakfast (08h00) Breakfast served between 08h00 and 08h30									
Maltabella	350g	375g	325g	375g	315g				
Milk	59ml	59ml	59ml	59ml	59ml				
Bread	2	2	2	2	2				
Tea with milk and sugar	250ml	250ml	250ml	250ml	250ml				
Sugar									
Milk powder and sugar mix	37g	37g	37g	37g	37g				
Sugar	23.5g	25.5g	23.5g	23.5g	23.5g				
Snack (10h00) No snack is served for normal and diabetic patients									
Lunch (12h00) Lunch is served between 12h00 and 12h30									
Chicken stew	105g	165g	165g	120g	125g				
White rice	240g	230g	205g	290g	170g				
Carrot and egg salad	60g	85g	80g	90g	120g				
Creamed spinach	75g	85g	80g	90g	95g				
WASTE AFTER CONSUMPTION									
Chicken bones	65g bones								
White rice	225g								
UNDISHED									
Chicken stew	8.985kg								
Rice	3.440kg								
Carrot salad	500g								
Spinach	300g								
Afternoon snack (14h30) Afternoon snack is served at 14h00									
Brown bread slices	2	2	2	2	2				
Butter	8g	8g	8g	8g	8g				

Tea with milk powder	250ml	250ml	250ml	250ml	250ml				
Milk powder and sugar mix	37g	37g	37g	37g	37g				
Supper									
Cottage pie	185g	400g	300g	180g	145g				
Butternut steamed	200g	100g	90g	165g	185				
WASTE AFTER CONSUMPTION									
Butternut peels	220g								
UNDISHED									
Cottage pie	5260kg								
Butternut with skin on	2325kg								
Late night snack (20h00)									
Bread slices	2	2	2	2	2				
Butter/margarine	15g	15g	15g	15g	15g				
Tea with milk powder and sugar	250ml	250ml	250ml	250ml	250ml				

HOSPITAL D: DAY 3

FEMALE AND MALE WARD

Food item	Served weight (Days 1-3) (5 samples)					Average per day (g/kg/ml)	A: Served weight of portion (g) (25 plates/number per ward)	B: Wasted food (g)	C: Actual intake (g)
Early morning tea (05h00 – 06h00)									
Brown bread slices with butter	2	2	2	2	2				
Tea with milk and sugar	250ml	250ml	250ml	250ml	250ml				
Breakfast (08h00) Breakfast served between 8h00 and 8h30									
Oats	255g	305g	255g	245g	280				
Milk	59ml	59ml	59ml	59ml	59ml				
Bread slices	2	2	2	2	2				
Tea with milk and sugar	250ml	250ml	250ml	250ml	250ml				
Milk powder and sugar mix	37g	37g	37g	37g	37g				
Sugar	27.2g	27.2g	27.2g	27.2g	27.2g				
UNDISHED									
Oats	4.028kg								
Snack (10h00) No snack is served for normal and diabetic patients									
Lunch (12h00) Lunch is served between 12h00 and 12h30									
Mince soup	185g	175g	175g	165g	180g				
Brown bread slices	2	2	2	2	2				
Yoghurt	100g	100g	100g	100g	100g				
UNDISHED									
Mince soup	2.150kg								
Afternoon snack (14h30) Afternoon snack is served at 14h30									
Brown bread slices	2	2	2	2	2				
Golden syrup	6g	6g	6g	6g	6g				
Butter	8g	8g	8g	8g	8g				
Tea with milk powder	250ml	250ml	250ml	250ml	250ml				
Milk powder and sugar mix	37g	37g	37g	37g	37g				
Supper									
Beef stew with bones	95g	105g	90g	115g	105g				
White samp	225g	225g	205g	200g	215g				
Steamed carrots	45g	50g	45g	57g	49g				

Cabbage and spinach mix	50g	50g	55g	52g	60g				
WASTE AFTER CONSUMPTION									
Samp	290g								
Carrots	80g								
Bones	295g + 355g								
UNDISHED									
Beef stew	4.596kg								
Samp	8.555kg								
Cabbage and spinach	1.755 kg								
Carrots	1.28kg								
Late night snack (20h00)									
Bread slices	2	2	2	2	2				
Butter/margarine	8g	8g	8g	8g	8g				
Golden syrup	6g	6g	6g	6g	6g				
Tea with milk powder and sugar	250ml	250ml	250ml	250ml	250ml				

APPENDIX 15: CONCEPTUAL FRAMEWORK OF PATIENT FOOD PROVISIONING (developed by researcher)