

THE IMPLEMENTATION OF AN ISO 22000 SYSTEM INTO A PRIVATE HOSPITAL
FOODSERVICE FACILITY AND THE IMPACT ON PATIENT SATISFACTION AND
FOOD SAFETY AUDIT RESULTS.

by

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ABSTRACT

Aim: To determine the impact of the implementation of an ISO 22000 system in the foodservice department of a private hospital on patient satisfaction levels and results of food safety audits conducted.

Objectives: To describe the demographics of hospital patients in terms of age, gender, length of hospital stay and type of special diet; to determine the patient satisfaction with the food and food service; to determine the relationship between demographics and patient satisfaction with the food and food service; to determine the impact of ISO 22000 on patient satisfaction; and to determine the impact of ISO 22000 on food safety audit results.

Method: A total of one hundred and sixty hospital patients were interviewed during four surveys conducted over a period of approximately one year, during which time the ISO 22000 food safety management system was implemented into the foodservice department of a private hospital facility. Patients were surveyed using a questionnaire which gathered demographic information as well as the responses of patients to various aspects of the food and food service. The results of these surveys were analysed to describe the demographics of the patients, the relationship between demographics and satisfaction levels and satisfaction levels with the food and food service after ISO 22000 implementation. The results were analysed and compared to determine any improvements in audit scores after ISO 22000 implementation.

Results: One hundred and sixty patients aged between 13 and 89 participated in the survey. One hundred and nineteen patients were female (74.4%) and forty one were male (25.6%). Most of the patients had been in hospital for between three and seven days and had not been on a special diet whilst in hospital. No statistically significant relationships were found between demographics and patient satisfaction levels with the food and food service. Overall, the responses with regards to food temperature, hygiene and cleanliness, food quality and the overall catering service indicated a generally high level of satisfaction. A statistically significant increase in satisfaction was found for the overall catering service, while a marginally significant increase was found for the food temperature after ISO 22000 implementation. The results of food safety audits improved after ISO 22000 implementation.

Discussion: Despite the lack of statistically significant improvements in some areas of patient satisfaction with the food and food service in this study, the improvements that were found in patients' satisfaction levels as well as the marked improvement in food safety audit results indicate that ISO 22000 does have a positive impact and offers many advantages in a hospital foodservice department.

Conclusion: ISO 22000 implementation shows promise to increase patient satisfaction and improve the results of food safety audits. It is therefore recommended that further studies in the South African hospital environment are conducted in order to gain a clearer understanding of the impact that a food safety management system will have on patient satisfaction levels with the hospital food and food service as well as food safety audit results.

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CHAPTER 1: INTRODUCTION, THE PROBLEM AND IT'S SETTING

1.1 Background to the significance of the study

Private healthcare in South Africa is a dynamic and highly competitive industry and patient satisfaction with the healthcare institution is of utmost importance. Areas of health provision including foodservices must monitor and address issues of efficiency and effectiveness to remain viable (Porter & Cant 2009; Fallon, Gurr, Hannah-Jones & Bauer 2008), therefore healthcare institutions must monitor and address patient satisfaction. It is expected that the food provided in a hospital is nutritious, of high quality and without question, free from contamination and therefore safe to consume. Food is emotive, especially when in hospital; most patients eagerly await mealtimes and it has been extensively reported in the literature that hospital food and nutrition services contribute to the recovery and well-being of the patient (Kokkinakis, Kokkinaki, Kyriakidis, Markaki & Fragkiadakis 2011; Naithani, Thomas, Whelan, Morgan & Gulliford 2009; Watters, Sorensen, Fiala & Wismer 2003; Dudek 2000). It has also been reported that the risk of malnutrition may increase as satisfaction with hospital foodservice decreases (Porter & Cant 2009). Malnutrition compromises the survival and well-being of patients, increases the length of hospital stay as well as the risk of complications (Hickson, Connolly & Whelan 2011). Quality management systems which include risk assessment, management commitment and involvement; enforcement of legislation, regulations and standards; and Hazard Analysis Critical Control Point (HACCP) can assist with the identification, prevention and management of malnutrition in a hospital (Kokkinakis *et al* 2011). HACCP is a science-based food safety system designed to identify specific hazards and develop corrective actions to control these hazards in order to ensure food safety and quality (Arvanitoyannis & Kassaveti 2009, p3). The immune-compromised including hospital patients, the elderly, pregnant women and children are particularly vulnerable to the effects of food poisoning (Hanekom, Vermeulen & Oldewage-Theron 2010). As a result the need for due diligence with regards to food safety is a non-negotiable necessity.

Patient satisfaction is very complex and far from clear. It is influenced by cultural, socio-demographic, cognitive and affective components (Heidegger, Saal & Nuebling 2006). Quality and satisfaction can be seen as synonymous terms (Taylor & Cronin 1994). Patients' expectations of hospital food have been shown to be a predictor of overall satisfaction with the food and foodservice and the manner in which it is served often influences patient

satisfaction with the entire hospital experience (Porter & Cant 2009). Avis, Bond and Arthur (1997) suggest that patients should evaluate their hospital care by considering whether it meets with their expectations and desires. The goal of any hospital caterer should be to provide food that meets the patients' nutritional requirements, satisfies the patient, improves morale and is microbiologically safe (Hartwell & Edwards 2001). A tool that can be implemented by a hospital caterer to assist in achieving patient satisfaction is the International Standards Organization (ISO) 22000 standard. ISO 22000 specifies the requirements for a food safety management system where an organisation in the food chain needs to demonstrate its ability to control food safety hazards in order to ensure that food is safe at the point of consumption. It is applicable to all organisations, regardless of size, which are involved in any aspect of the food chain and want to implement systems that consistently provide safe food (International Standards Organization (ISO) 22000:2005, p1). ISO 22000 is a management tool, used to protect the food supply chain and production processes against microbial, chemical and physical hazards and contamination.

ISO 22000 was published in September 2005 and prior to this the HACCP system was the internationally accepted approach for a food safety management system. However, it was felt that HACCP did not provide sufficient emphasis on the management of the system, and so ISO 22000 was developed. ISO 22000 has been aligned with other International Standards such as ISO 9001 which address various aspects of quality management, in order to enhance the management of both the quality and safety of the final food product. As ISO 22000 focuses on quality and customer satisfaction as well as food safety, the adoption of this system in the foodservice department of a hospital should therefore enhance the patient experience and lead to an improvement in patient satisfaction levels. Furthermore, ISO 22000 leads to the retention of both food quality and the nutritional value of the food thereby contributing to both the patient satisfaction levels and the health outcome (Uyar, Dikmen, Kizil, Tengilimoglu, Bilici, Tavasli & Saglam 2012).

The position statement of the American Dietetic Association (ADA) states the following: "It is the position of the American Dietetic Association that the public has the right to safe food and water supply. The Association supports collaboration amongst dietetic professionals, academics, representatives of the agricultural and food industries, and appropriate government agencies to ensure the safety of the food and water supply by providing education to the public and industry, promoting technologic innovations and applications, and supporting

further research”(Gerald & Perkin 2003). This ADA report by Gerald and Perkin (2003) highlights the increased implementation of HACCP as one of the reasons that bacterial food borne illnesses have been substantially reduced in the United States of America (USA) in the period 1996 – 2003. The ADA acknowledges that the HACCP system, amongst other codes and regulations, provides a framework within which current and future challenges to the safety of food service systems can be evaluated.

1.2 Purpose of the study and statement of the problem

Literature shows that HACCP has been in place in hospital foodservice departments since at least 1993 (Richards, Parr & Riseborough 1993). It has been reported that this simple and logical system makes it an ideal tool for both hospital infection control and food hygiene practices and therefore the health departments of many countries have encouraged the implementation of HACCP in hospitals (Kokkinakis *et al* 2011; Shih & Wang 2011; Gikas, Kritsotakis, Maraki, Roubelaki, Babalis, Scoulica, Panoulis, Saloustris, Kontopodis, Samonis & Tselentis 2007; Angelillo, Viggiani, Greco & Rito 2001; Osborn, Albright, Southard & German 1997; Barrie 1996). Several studies have demonstrated the value of HACCP in hospitals, which include the identification of potential hazards before they occur, the high degree of involvement of all catering staff, improved food safety practices and the ability of the system to raise both the quality and safety of the food that is produced (Kokkinakis *et al* 2011; Shih & Wang 2011; Gikas *et al* 2007; Angelillo *et al* 2001; Barrie 1996; Richards *et al* 1993). Other studies have shown an improvement in food safety audit outcomes and the microbiological results of surface, equipment and hand swabs as well as food samples taken from hospital kitchens where HACCP has been implemented (Farzianpour, Namati, Raesi, Torabi, Rahmani, Manafi, Shafii, Shojaei & Mehrabany 2014; Oliveira, Batista & Aidoo 2001; Shanaghy, Murphy & Kennedy 1993). In a hospital setting, a HACCP-based system is recommended to prevent, eliminate or reduce the likelihood of serving contaminated food to a patient (Stamey 2006).

To date, only one study conducted by Uyar *et al* (2012) in Turkey has investigated the differences in patient satisfaction before and after the implementation of ISO 22000 in a hospital foodservice department. The results of this study showed that the implementation of ISO 22000 into a hospital foodservice department not only improved the food quality but also improved organoleptic, menu and service specifications as well as increased overall patient satisfaction scores (Uyar *et al* 2012). However Uyar *et al* (2012) did not investigate whether

the implementation of ISO 22000 resulted in improvements in food safety audit results or the results of microbiological swabs or food samples taken from the hospital kitchen.

This study investigated whether the implementation of ISO 22000 in the hospital foodservice department would result in an increase in patient satisfaction with the food and food service and improved overall food safety audit results. This study specifically investigated and reported on patient satisfaction with the food and food service, rather than dissatisfaction. The purpose of this study therefore, was to investigate and determine whether the same outcome for patient satisfaction, as found by Uyar *et al* (2012), would be achieved in a South African private healthcare facility.

1.3 Objectives and hypothesis

1.3.1 Objectives

The objectives of this study were:

1. To describe the demographics of the hospital patients including their age, gender, length of hospital stay and type of diet that they were receiving.
2. To determine the patients' satisfaction with the food and food service with regards to the food temperature, hygiene and cleanliness, food quality and the overall catering service.
3. To determine the relationship between the patients' demographics and their satisfaction with the food and food service.
4. To determine the impact of ISO 22000 implementation on patient satisfaction with the food and food service.
5. To determine the impact of ISO 22000 implementation on the results of food safety audits that were conducted.

1.3.2 Hypothesis

The expected outcome of this study was that the implementation of ISO 22000 into the foodservice department of the hospital would result in an increase in patient satisfaction levels and improve the overall food safety audit results.

It was proposed that the outcome of this study would assist in determining firstly whether ISO 22000 was worth the effort, time and money involved in its implementation, and secondly to what extent the system was advantageous to a catering company operating a hospital foodservice department.

1.4 Type of study

This study was a cross-sectional survey-based study as it involved a single questionnaire administered to each member of the sample population at only one point in time. Although the study was repeated several times in the same setting, different people were included at each study. Both quantitative and qualitative methods were used. Most of the study made use of quantitative methods which involved the analysis of primary data, including the information collected and analysed specifically for the research study. Some qualitative methods were used and this included the opinions of the study population surveyed by means of a section on the questionnaire which asked for written comments.

1.5 Study parameters

This study took place in one private hospital facility in Port Shepstone in KZN. Patients in the maternity ward, surgical ward and medical wards were included in this study and patients must have eaten at least one meal provided by the hospital foodservice department to have been included. Patients in the paediatric ward and the intensive care unit (ICU) were excluded from this study due to their inability to fully evaluate the quality of the food service and therefore their inability to fully participate.

1.6 Assumptions

The following assumptions were made in this study:

- The catering company had been operating at the hospital for over ten years and was therefore able to design menus that were both appropriate and acceptable for the season and hospital population. It was therefore assumed that the change in patient satisfaction levels over the time period that the study took place were due to the ISO 22000 implementation and not due to the menu. The menu in place when each survey was conducted had been approved by the hospital management for the season and hospital population; no changes were made to the menu due to ISO 22000 implementation.
- Patients would complete the questionnaire truthfully and without bias.
- As English is the language used in all hospital communication (menus, admission forms and comment cards) it was assumed that English was understood by all hospital patients.

- As there is no known conflict of interest, it was assumed that the independent auditor conducting the food safety audits did so without bias.
- An accredited microbiological laboratory not linked to the catering company was used for analysis of the swabs and food samples taken during food safety audits; and therefore it was assumed that these results were accurate.

1.7 Abbreviations

The following abbreviations were used in this dissertation:

ACHFPSQ: Acute Care Hospital Foodservice Patient Satisfaction Questionnaire

ADA: American Dietetic Association

FAO: Food and Agricultural Organisation

FCS: Food Consulting Services

HACCP: Hazard Analysis Critical Control Point

ICU: Intensive Care Unit

ISO: International Organization for Standardization

SABS: South African Bureau of Standards

SANAS: South African National Accreditation System

SANS: South African National Standard

SPSS: Statistical Package for the Social Sciences

UK: United Kingdom

USA: United States of America

WHO: World Health Organisation

1.8 Definition of terms

The following definitions are given for terms specific to the topic of this research study:

Allergen: “Any substance that causes an allergic or other adverse immune response” (Foodstuffs, Cosmetics and Disinfectants Act, Act 54 of 1972, No. R 146, 2010, p5).

Food safety audit: “A systematic, independent and documented process for obtaining objective evidence and evaluating it objectively to determine the extent to which food safety requirements are fulfilled” (South African National Standard 10049:2012, p5).

Food safety: “The concept that food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use” (International Standard ISO 22000:2005, p2).

Food safety hazard: “A biological, chemical or physical agent in, or condition of food, with the potential to cause an adverse health effect” (South African National Standard 10330:2007, p6).

Food poisoning: Illness that results from the ingestion of bacteria, their toxins or viruses, which may be present in food (Barrie 1996).

Foodservice organisation: “Food handling business which during its operations, processes, manufactures, stores, transports, distributes or sells foodstuffs or is engaged in any activity which may impact on the safety of such foodstuffs” (South African National Standard 10330:2007, p6).

HACCP: “A system that identifies evaluates and controls hazards that are significant to food safety” (South African National Standard 10330:2007, p7).

- ISO 22000: “Specifies the requirements for a food safety management system where an organisation in the food chain needs to demonstrate its ability to control food safety hazards in order to ensure that food is safe at the point of human consumption” (International Standards Organization ISO 22000:2005, p1).
- ISO 9001: Sets out the criteria for a quality management system, is based on a number of quality management principles including customer focus, motivation and implication of top management, the process approach and continual improvement (International Standards Organization ISO 9001:2008 <http://www.iso.org/iso/catalogue>).
- Patient satisfaction: “The level of experience of a patient in accordance with his/her expectations” (Vuković, Gvozdrenović, Gajić, Stamatović Gajić, Jakovljević & McCormick 2012).

1.9 Summary

It is important to measure patient satisfaction in order to determine the effectiveness of any service provided in a hospital (Thind 2010). Patient satisfaction with the food and foodservice is essential as food received by patients in hospital may have an integral role in their health outcome as well as contribute to their recovery and well-being and decrease the risk for malnutrition during hospitalisation. Hospital patients are particularly at risk for food borne infections, therefore a hospital foodservice department must provide food that will meet the patients’ nutritional needs, is of a high quality and safe to consume. It is therefore necessary for a catering company operating a hospital foodservice department to adopt an effective system, such as ISO 22000, as a means of achieving high food quality and food safety standards.

The purpose of this study was to determine the success of the ISO 22000 system on patient satisfaction and the safety of the food provided to patients attending a private hospital. While very few international studies surrounding this topic have been conducted, none have taken place in South Africa and so it was anticipated that the results of this study would provide a

valuable insight into the effectiveness of the ISO 22000 system in a South African hospital setting.

1.10 Dissertation overview

While chapter one covered the background, purpose and objectives of the study, chapter two will review the literature surrounding the topic of the study. Chapter three will discuss the methods undertaken in order to meet the set objectives and chapter four will present the results that were obtained from the analysis of the data. Chapter five will discuss the results that were presented in chapter four with particular reference to the objectives of the study. Chapter six will draw conclusions from the results and discuss these results in relation to the expected outcome of the study.

CHAPTER 2: REVIEW OF THE RELATED LITERATURE

This chapter will review studies that have been conducted on patient food intake in hospitals, patient satisfaction and food safety in a hospital food service environment. The first section will cover food intake and malnutrition in hospitalized patients. The second section will discuss patient satisfaction and factors that affect patient satisfaction. The third section will cover factors affecting the quality of food service in hospitals. The fourth section will cover food safety in hospitals. This section will discuss food safety legislation and industry standards in South Africa and internationally, the HACCP system and the ISO 22000 system with specific reference to the use of these systems in hospital food service. The final section will give a summary of the reviewed literature.

2.1 Food intake and malnutrition in hospitals

It is expected that the food provided to patients in a hospital is nutritious, of high quality and without exception, free from contamination and therefore safe to consume (Lund & O'Brien 2009; Hartwell & Edwards 2001; Barrie 1996; DeLuco & Cremer 1990). Many patients experience emotions such as fear, anxiety and depression when in hospital; these are associated with decreased food intake and unintentional weight loss (Simmons, Cleeton & Porchak 2009). Meals have a significant impact on a patients' perceived well-being and mealtimes are anticipated as a welcome interruption to the daily ward routine (Lassen, Kruse & Bjerrum 2005). It has been extensively reported in the reviewed literature that the hospital food and nutrition service contribute to the recovery and well-being of the patient (Theurer 2011; Johns, Hartwell & Morgan 2010; Lassen *et al* 2005; Hartwell & Edwards 2001; Dudek 2000; McWhirter & Pennington 1994). The nutritional status of the patient has important effects on health which in turn affect recovery from illness or injury, and malnutrition is a known risk factor for the development of complications. The consequences of malnourished patients include high hospital costs because of an increased length of hospital stay as well as an increased usage of resources (Hickson *et al* 2011).

In a study conducted by McWhirter and Pennington (1994) it was found that 40-50% of the 500 patients admitted to a Scottish hospital were undernourished and two thirds of patients lost weight during their hospital stay, putting those already malnourished at an even greater risk. Loss of muscle mass affects respiratory function, resulting in an increased susceptibility to chest infections, reduced cardiac function and impaired immune function which inevitably

leads to complications that result in increased morbidity and mortality as well as an increased length of hospital stay (McWhirter & Pennington 1994). Also highlighted in this study was that a 25% loss of body weight was associated with apathy, depression, fatigue and the patients' loss of will to recover.

This was substantiated by Hiesmayr, Schindler, Pernicka, Schuh, Schoeniger-Hekele, Bauer, Laviano, Lovell, Mouhieddine, Schuetz, Schneider, Singer, Pichard, Howard, Jonkers, Grecu and Ljungqvist (2009) who conducted the Nutrition Day survey, a multinational one-day survey of nutritional factors and food intake of hospital patients conducted in Europe in 2009. The results of this study showed that 60% of hospitalized patients in European hospitals ate less food than provided by the hospital food service and that this decreased food intake represented an independent risk factor for hospital mortality. The odds ratio for dying within 30 days while in hospital increased progressively as the amount of food consumed during decreased (Hiesmayr, Schindler, Pernicka, Schuh, Schoeniger-Hekele, Bauer, Laviano, Lovell, Mouhieddine, Schuetz, Schneider, Singer, Pichard, Howard, Jonkers, Grecu & Ljungqvist 2009).

Barton, Beigg, Macdonald and Allison (2000) conducted a study to investigate the cause of continuing weight loss in hospital patients. It was found that although the hospital menu was nutritionally adequate, energy and protein intakes were low, plate waste was high and patients did not meet their recommended intakes. This helps to explain the reasons for weight loss in hospital patients, which has undesirable clinical and economic consequences (Barton, Beigg, Macdonald & Allison 2000).

Dudek (2000) investigated the reasons why hospital patients were malnourished and what could be done to improve this situation. The results from this investigation revealed that patients generally did not like the hospital food and therefore would not eat the food provided. Malnutrition was further exacerbated by loss of appetite, hospital procedures and treatments interfering with mealtimes, increased nutritional requirements and altered metabolism of the patient (Dudek 2000). Even short term decreases in nutritional intake can lead to catabolism of subcutaneous fat and muscle tissue with catastrophic consequences as already highlighted. Dudek (2000) concluded that every hospital patient should be considered at risk for malnutrition and early identification and intervention is critical.

Food should therefore be seen as an inseparable part of patient treatment. Although the literature reviewed shows an increasing awareness of the incidence of malnutrition in hospitals and its effect on patient recovery and length of stay, it remains a largely unrecognised problem. A ten year comparative study conducted in Switzerland compared patient nutritional intakes before and after the implementation of corrective measures to improve nutritional outcome (Thibault, Chikhi, Clerc, Darmon, Chopard, Genton, Kossovsky & Pichard 2011). The corrective measures implemented were the application of food recommendations including patient self-menu selection, changes in meal serving times and duration of cooking, as well as decreased use of restrictive diets. The results of this study revealed that the corrective measures implemented did not result in improvements in the patients' nutritional intake (Thibault *et al* 2011). This highlights the need to further investigate the factors that affect patient satisfaction with the food and food service, in order to reduce the incidence of malnutrition in hospitals.

2.2 Patient satisfaction and factors affecting patient satisfaction in hospitals

Customer satisfaction can be defined as “a level of experience of a person in accordance with his/her expectations” (Vuković *et al* 2012). Satisfaction can also be explained as a comparison between an expectation and reality or experience (Fallon *et al* 2008). Many researchers writing about customer satisfaction go as far as to say that “quality” and “customer satisfaction” are synonymous terms. Capra, Wright, Sardie, Bauer and Askew (2005) reported that the majority of service quality research has foundations in the expectancy-disconfirmation theory, which defines perceived service quality as the difference between the actual service performance and expectations (Capra *et al* 1993). This theory measures the process of customer satisfaction and dissatisfaction and can be used to explain how a customers' satisfaction of an experience is related to their expectations of the experience before it took place (Pizam 1993).

The healthcare industry has become a dynamic and highly competitive industry. Patient satisfaction is regarded as a major factor in the development and improvement of quality healthcare services to meet patients' increasing demands for service excellence. Satisfied patients are more likely to comply with medical treatment and maintain their relationship with a specific healthcare provider, and are also more likely to continue using the healthcare facility and recommend it to others (Hekkert, Cihangir, Kleefstra, van den Berg & Kool

2009). Satisfaction whilst in hospital is also more likely to lead to improved patient morale and a speedier recovery.

The concept of patient satisfaction is however very complicated and far from clear (Heidegger *et al* 2006). It is influenced by a multitude of factors including cultural, socio-demographic, psychosocial, cognitive and emotional factors as well as the expectations of the individual. The remainder of this section will review factors affecting patient satisfaction in a healthcare situation with particular reference to hospital food service. A review of the available literature shows that the factors affecting patient satisfaction with healthcare and especially hospital food service can be broken down into the following areas as shown in Figure 2.1: demographic factors, socio-economic factors, health-related factors, environmental factors and food quality. Each of these factors will be covered in the following sections.

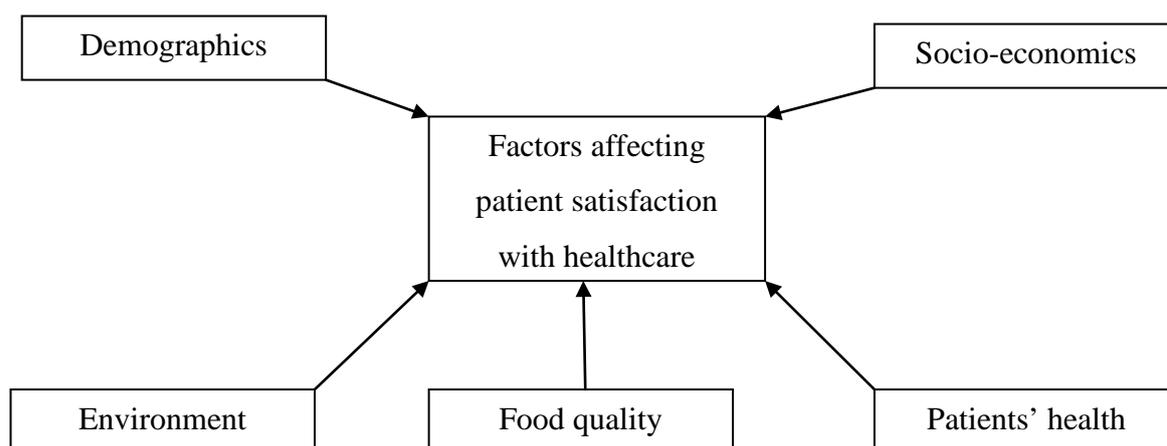


Figure 2.1 Factors affecting patient satisfaction in a healthcare situation

2.2.1 Demographic factors

Demographic factors affecting patient satisfaction such as age, gender and to a lesser extent race have been the subject of many research projects. In a study conducted by Fallon *et al* (2008) no difference was found in overall satisfaction based on the patient's age. Hekkert *et al* (2009) however reported that in terms of demographic characteristics, age seems to be the most consistent predictor of patient satisfaction with older patients being more satisfied than younger patients (Hekkert *et al* 2009). This was substantiated by research done by Vukovic *et al* (2012); Young, Meterko and Desai (2000); Belanger and Dube (1996) and Dube, Trudeau and Belanger (1994). Significant differences have been found in the food preferences of older

patients compared to younger patients, and this should be taken into account during menu planning if a hospital population is dominated by a particular age group, for example geriatric, paediatric or maternity patients (Kennewell & Kokkinakos 2001).

Studies exploring the effects of gender on patient satisfaction show less consistent results. A study done by Dube *et al* (1994) found that in general, women were more satisfied than men whereas conversely Belanger *et al* (1996) reported that more positive responses were reported by men than women. No difference in satisfaction between genders was reported by Sitzia and Wood (1997) and Fallon *et al* (2008). In another study, effects of gender were inconsistent and gender was found to be a less important determinant of patient satisfaction than age (Hekkert *et al* 2009). Kennewell and Kokkinakos (2001) reported that there are significant differences in food preferences between genders. Fresh fruit, salads and vegetables were found to be more popular with women and red meat, poultry and eggs more popular with men (Kennewell & Kokkinakos 2001). Men and women have also been found to have different food quality perceptions (Johns *et al* 2010). This should be considered when planning menus for a specific gender, for example in a maternity or gynaecology ward.

Two reviews were found that investigated the impact of race on patient satisfaction. Young *et al* (2000) conducted an analysis on the secondary data of patient satisfaction questionnaires in the USA and found that race consistently had a statistically significant effect on satisfaction scores with non-white patients reporting lower satisfaction levels than white patients. Sitzia and Wood (1997) reviewed over 100 articles published in the field of patient satisfaction and found that ethnicity has been shown to influence satisfaction ratings, although to a lesser extent than other demographic factors such as age (Sitzia & Wood 1997). Ethnicity relates to cultural values and may play a role in menu planning depending on the majority ethnicity of the hospital population concerned.

2.2.2 Socio-economic factors

The literature shows that education, occupation and income level influence patient satisfaction, but the effects that have been reported are not consistent. Belanger and Dube (1996) reported that education and occupation did not significantly influence patients' emotions. However a variety of other studies indicate that higher education levels and higher incomes are associated with lower satisfaction ratings, indicating that more educated patients

with higher incomes have higher expectations (Vuković *et al* 2012; Hekkert *et al* 2009; Young *et al* 2000).

2.2.3 Health-related factors

One of the most significant factors affecting patient satisfaction levels is the health status of the patient (Otani, Waterman & Claiborne 2012; Wolf, Olsson, Taft, Swedberg & Ekman 2012; Hekkert *et al* 2009; Young *et al* 2000). Health-related factors include chemosensory dysfunction and changes that commonly occur during ill health and hospitalisation. These changes can alter a person's ability to taste and enjoy food. Over 250 medications may alter taste and smell and at least 30 medical conditions have been identified as having the potential to cause chemosensory dysfunction. Other causes of chemosensory dysfunction include tobacco use, ageing, oral and dental health, xerostomia (dry mouth), candidiasis, chemotherapy, stroke, respiratory infections, head trauma and gastric reflux (Wylie & Nebauer 2011). Emotional factors relating to health that affect patient satisfaction levels include anxiety, stress and depression (Dube *et al* 1994) while physical aspects such as pain and discomfort (Heidegger *et al* 2006) have also been found to affect satisfaction levels.

The effects of length of hospital stay and previous hospitalisation have also been investigated. Tranter, Gregoire, Fullam and Lafferty (2009) reported that patients with a longer length of stay who provided written comments on a patient satisfaction questionnaire were more likely to give positive ratings compared to those with a shorter length of stay and higher perceived health status (Tranter, Gregoire, Fullam & Lafferty 2009). Contrary to this, Uyar *et al* (2012) found that there was a negative relationship between length of stay and the satisfaction levels for food and food service in their study conducted in Turkey. However Fallon *et al* (2008) found no difference in satisfaction levels according to length of hospital stay. Belanger and Dube (1996) reported that length of stay and previous hospitalisation did not significantly influence patient emotions and therefore patient satisfaction levels (Belanger & Dube 1996).

Several studies confirm that patients in a good state of health or those that judge their health status favourably reported more positive levels of satisfaction (Hekkert *et al* 2009; Belanger & Dube 1996). A similar finding was reported by Young *et al* (2000) who concluded that patients who perceive themselves to be healthier may be more satisfied with life in general and this positive attitude may carry over to their satisfaction with hospital care and services (Young *et al* 2000). In a study to determine how seriously ill patients differ from less

seriously ill patients in terms of how they rate their healthcare experiences, Otani *et al* (2012) established that seriously ill patients are less likely to positively rate the overall quality of their care and are less likely to recommend the healthcare institution compared to others (Otani *et al* 2012).

2.2.4 Environmental factors

Patient satisfaction with the hospital food service is often influenced by the environment in which the food is served. Belanger and Dube (1996) suggest that the management of environmental conditions in which food is served, such as the level of noise, room temperature, colour of walls and background music may significantly influence arousal emotions, leading to a more positive patient satisfaction level with the food service (Belanger & Dube 1996). Mealtime interruptions, unpleasant odours, cleanliness of crockery and cutlery and cutlery shortages are other environmental factors that have been identified to influence patient satisfaction (Jessri, Mirmiran, Jessri, Johns, Rashidkhani, Amiri, Barfmal & Azizi 2011). Hickson *et al* (2011) conducted a study in a United Kingdom (UK) hospital where protected mealtimes were introduced so that patients could eat without being interrupted and staff could offer assistance. According to these authors, protected mealtimes were “periods on a ward when all non-urgent clinical activity stops”. However, this did not show an improvement in patient mealtime experience nor nutrient intake, indicating the need for further research into the ward mealtime environment (Hickson *et al* 2011).

The Better Hospital Food Project was implemented at a UK hospital in 2001 as part of a government initiative to overhaul hospital food services with the intention of “fattening up” malnourished hospital patients. A strong feature of this project was an emphasis on the environment in which the food was provided. It was recommended that the patient should be in a comfortable position in a pleasant environment, assistance with eating should be given where necessary and practical issues such as the use of special cutlery and well-fitting dentures should be considered (Schenker 2001).

Young *et al* (2000) examined the extent to which a patients’ satisfaction level related to the institutional characteristics of the health care facility. These researchers reported that the hospital size consistently had a significant effect on the satisfaction ratings as patients may perceive larger hospitals as impersonal and intimidating. These factors should be taken into account when analysing data received from patient satisfaction surveys.

2.2.5 Food quality

Several researchers have identified food quality and satisfaction with the hospital food service as one of the most important determinants of overall hospital satisfaction ratings (Fallon *et al* 2008; Watters *et al* 2003; Wright, Capra & Aliakbari 2003; DeLuco & Cremer 1990). In an American study by DeLuco and Cremer (1990) where 223 patients were interviewed telephonically after discharge from a hospital, 87% of respondents considered the food and food service to be important when selecting a hospital for medical care. Literature shows the food quality components that patients are most concerned with include temperature, taste, texture, appearance and presentation of the food (Tranter *et al* 2009; González Molero, Oliveira Fuster, Liébana, Oliva, Láinez López & Muñoz Aguilar 2008; Hartwell, Edwards & Beavis 2007; Sahin, Demir, Celik & Kadir Teke 2006; DeLuco & Cremer 1990).

The literature is overwhelmingly in agreement with the significant effect of temperature of food on patient satisfaction levels (Tranter *et al* 2009; González Molero *et al* 2008; Sahin *et al* 2006; Stanga, Zurflüh, Roselli, Sterchi, Tanner & Knecht 2003; O'Hara, Harper, Kangas, Dubeau, Borsutzky & Lemire 1997). Stanga *et al* (2003) reported that food temperature is an aspect of hospital catering that patients in Switzerland consider to be very important and in order to ensure that hot food is kept warm; the method of transport from the kitchen to the bedside should be carefully considered. In a study conducted in Spain to assess the influence of temperature on the amount of food eaten by patients, it was found that patients served hot food from isothermal trolleys, ate significantly more than those served with food not kept in the isothermal trolley (González Molero *et al* 2008). This is an important consideration when investigating the factors that affect patient satisfaction with the food and food service in order to address the high incidence of malnutrition amongst hospital patients.

Texture, taste and the appearance and presentation of food have been found to be statistically significant and important determinants of patient satisfaction with food and this may be especially so for therapeutic diets where modifications to texture and appearance are characteristics of the diet (Jessri *et al* 2011; Hartwell *et al* 2007; Sahin *et al* 2006; Stanga *et al* 2003; Dube *et al* 1994). The findings of a Canadian study by O'Hara *et al* (1997) suggest that therapeutic or texture-modified diets can be as appealing as regular diets if consideration is given to the taste, appearance and presentation of these diets. In many instances hospitalised patients have less of an appetite than at home, and therefore an attractively presented plate of

food may help to stimulate the appetite and result in a better food and nutrient intake (Stanga *et al* 2003).

All these factors are critical considerations when planning hospital menus, as food quality influences food intake, food wastage and nutrient intake (Jessri *et al* 2011; Johns *et al* 2010). It is therefore necessary to take into account that the menu is an important factor of overall satisfaction and it is essential to give special emphasis to patient considerations during menu planning. A well planned and well balanced menu will not only positively affect patient satisfaction levels but may also reduce hospital malnutrition and as such provides an excellent opportunity to expose patients to an example of a healthy diet. In a study conducted by Watters *et al* (2003) in Canada, patients thought that food served in a hospital should be a model for a healthy diet (Watters *et al* 2003). This was reiterated by Donini, Castellaneta, Guglielmi, De Felice, Savina, Coletti, Paolini and Cannella (2008) who stated that hospital food can become an educational tool, and may stimulate patients to maintain healthy eating habits after discharge (Donini *et al* 2008). It has been reported that as interventions to improve food quality are made and patients' expectations are increasingly met or exceeded, patient satisfaction ratings increase (Theurer 2011). The factors affecting hospital foodservice satisfaction include not only the factors affecting patient satisfaction, but also the factors affecting the quality of the service of the food to the patient, and therefore these factors must also be considered to promote the health and nutritional status of the patient.

2.3 Factors affecting the quality of foodservice in hospitals

Food served in a hospital should be regarded as part of the clinical treatment process. It can be viewed as an important aspect of easing the anxiety, stress and suffering, experienced by most patients during hospitalisation. Eating well contributes to a sense of wellbeing and enhanced patient satisfaction (Aase 2011; Vozenilek 1999). Consideration should be given to the actual provision of the food to promote and encourage food intake thereby ensuring the nutritional requirements of the patient are met. In addition, improvements in the provision of food will assist with addressing the issue of malnutrition in hospitals. Factors that should be considered to improve the provision of food to the patient are the type of catering system used, the mode of food service delivery, the foodservice staff and the hospital staff.

2.3.1 The catering system

Freil, Nielsen, Biltz, Gut, Mikkelsen and Almdal (2006) conducted a study to determine whether the reorganisation of a hospital catering system would lead to increased energy and protein intake in patients with an inadequate nutritional intake. The catering system was reorganised to allow patients to choose their evening meal individually and the menu was changed to include more foods with a high energy density. The results of this study demonstrated that these simple changes to the catering system not only increased protein and energy intake by patients, but also led to a substantial reduction in the wastage of food (Freil, Nielsen, Biltz, Gut, Mikkelsen & Almdal 2006).

2.3.2 Mode of food service delivery

In the highly competitive health care environment, patients are expecting and demanding more from their hospital experience. Several studies have looked at the mode of food service delivery in an effort to meet these ever increasing demands.

A hotel-style room service system which includes restaurant-style menus and restaurant-style tray services are methods of food service delivery that have been introduced in the hospital food service industry with varying degrees of success. Sheehan-Smith (2006) conducted a study in the USA to identify the advantages and disadvantages of a hotel-style room service as well as the barriers to and facilitators for the implementation of this system. Although the co-operation and “buy in” of the nursing staff were a barrier and increased cost a disadvantage, several advantages to this type of meal delivery system were identified. Advantages included increased patient control over food choice, decreased plate waste, improved food quality, decreased food cost, an increase in food service employee job satisfaction as well as an improvement in patient food service satisfaction ratings (Sheehan-Smith 2006).

Theurer (2011) recommends a room service system as a way to meet and exceed the food service expectations of the patient. Theurer (2011) investigated the impact of low-cost interventions such as allowing patients to indicate their portion size preference; inclusion of condiments to the normal, diabetic and cardiac diet menus; alteration to cooking times of vegetables and improvement to the seasoning of soups. The results however showed that these low-cost interventions were not effective in significantly improving patient satisfaction scores (Theurer 2011). Based on these results it was suggested that in order to improve food

service satisfaction scores, higher-cost interventions such as a room service system should be considered, as it has been shown that the implementation of a hospital room service system ultimately enhances patient satisfaction (Norton 2008; Goehring 2002). However, due to the high cost of a room service system, this may not be practical in South Africa where the majority of patients are based in government operated hospitals.

2.3.3 Foodservice staff

The attitude and care of the food service staff play a role in the perceived quality of the food service. When delivering meals, food service staff should be aware that patients may be experiencing feelings such as fear and anxiety. Therefore clear, effective communication is necessary when a patients' request cannot be met, for example, when there is a change in the diet prescription (Belanger & Dube 1996). Watters *et al* (2003) suggest that patients should be provided with information on ingredients, how meals are prepared and menu choice in an effort to improve communication with patients (Watters *et al* 2003). A clear and concise explanation of the menu will improve food intake as patients will know exactly what to expect from the meal they have ordered. Patients should be involved in decision-making, treated with respect, attended to timeously and receive emotional support and where possible, the family should be involved (Heidegger *et al* 2006). Johns *et al* (2010) conducted a study in the UK to examine the provision of hospital meals from the patients' viewpoint and found that for many patients, food service staff offer a chance to conduct a "non-illness" related conversation with someone other than the medical staff (Johns *et al* 2010).

Vozenilek (1999) reported on a project conducted in a USA hospital by a registered dietitian. The dietitian successfully overhauled the menu and dining experience for the patients with the aim of satisfying the culinary expectations and nutritional needs of patients all at once. This was achieved by paying particular attention to ingredient selection, cooking techniques, portion sizing and appealing plate presentation. The "normal" or full ward diet was planned around sound nutritional principles and healthy cooking techniques were employed. This meant that the full ward diet met the requirements of certain therapeutic diets, enabling the overall number of diets served to be reduced, resulting in a more streamlined service to patients and reduced food service costs. All nursing and food service staff were educated about the food service improvements to gain their commitment and to emphasise the importance of teamwork in patient satisfaction (Vozenilek 1999).

2.3.4 Hospital staff

The critical role of effective communication between hospital management, nursing staff, hospital dietitians and food service staff was highlighted by Donini *et al* (2008), who reported on a quality improvement programme adopted by a private hospital facility in Italy. One of the changes adopted was improved co-operation between different staff groups and the involvement of hospital management; because continuous mediation between dietitians and nursing staff is essential for patient compliance to dietetic treatment (Donini *et al* 2008). Nursing staff have an important role to play in finding out why a patient does not eat the hospital food. The reasons may be practical ones such as incorrect cutlery or ill-fitting dentures, or they may be reasons of poor food quality, that need to be communicated to the food service management in order for improvements to be made (Schenker 2001).

The goal of any hospital food service department should be to provide food that meets the patients' nutritional requirements, satisfies the patient, improves morale and is microbiologically safe to eat (Hartwell & Edwards 2001). The remainder of this chapter will discuss food safety in hospital food service and measures that can be implemented to ensure the safety of the food being served.

2.4 Food safety in hospital food service

“Consumers have the right to expect that the food they purchase and consume will be safe and of high quality” (Gardner 1993). A definition of food safety has been provided by ISO as the “concept that food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use” (International Standard ISO 22000:2005, p2). In order to be considered safe to consume, food must be free from potential food safety hazards. A food safety hazard is a “biological, physical or chemical agent in or condition of food, with the potential to cause an adverse health effect” (South African National Standard 10330:2007, p6).

Hospital food services can be regarded as “high risk”, due to the nature of the population that they serve (Hartwell & Edwards 2001). Sick people, immune-compromised individuals, pregnant women, the elderly and children are particularly vulnerable to the effects of food poisoning. In addition, hospitals usually provide enteral feeds that can be classified as microbiologically high risk foods, as the ingredients in these feeds are excellent media for bacterial growth (Oliviera *et al* 2001). Contamination of enteral feeds has been documented

and the consequences of contamination include septicaemia, bacteraemia, diarrhoea and pneumonia (Anderton 2000). Therefore, particular attention to food safety with rigorous preventative measures is paramount when preparing and serving food to patients in hospital (Buccheri, Casuccio, Giammanco, Giammanco, La Guardia & Mammina 2007). This level of food safety can be achieved by the adoption of internationally recognised and credible food safety management systems.

2.4.1 Food safety legislation and standards internationally

The Codex Alimentarius Commission was established by the Food and Agricultural Organisation of the United Nations (FAO) and the World Health Organisation (WHO) in 1963, in an attempt to regulate the conflicting nature of food regulations globally. This Commission develops international food standards, guidelines and codes of practice, based on scientific advice to protect the health of consumers and ensure fair practices in the food trade. Codex Alimentarius has become the global reference point for the food industry and national food control agencies with regard to food safety standards. The Commission aims to harmonise food standards and ensure their global implementation (Codex Alimentarius 2006). Currently the Commission has 185 member countries, including South Africa, which has been a member since 1994. The Codex standard entitled “General principles of food hygiene” (2003) is just one of the many internationally accepted standards on which member countries have established food safety legislation.

2.4.2 Food safety legislation and standards in South Africa

In South Africa, the only mandatory legislation governing the hygiene and food safety requirements for food is Regulation 962: 2012 of the Foodstuffs, Cosmetics and Disinfectants Act, 1972 (Act 54 of 1972). This regulation is entitled “Regulations governing general hygiene requirements for food premises and the transport of food”. This regulation states that “no person shall handle food or permit food to be handled on a food premises in respect of which a valid certificate of acceptability has not been issued or is not in force” (Foodstuffs, Cosmetics and Disinfectants Act 54, Regulation 962, 2012, p5). It is therefore a legal requirement for all food premises to have a valid certificate of acceptability in place, which has been issued by the local Department of Health.

The South African Bureau of Standards (SABS) is a statutory body, that was established in terms of the Standards Act, 1945 and operates in accordance with the latest edition of the

Standards Act, 2008 (Act No. 29 of 2008). The SABS is the national institution for the promotion and maintenance of standardisation and quality in connection with commodities and the rendering of services. The SABS publishes national standards known as South African National Standards (SANS). These standards, which are prepared by technical committees through a consensus process, provide information which are in line with international standards (South African Bureau of Standards, Overview, About the SABS 2013).

The SABS has published two food safety standards which are widely used and recognised in the South African food industry. The first of these is SANS 10049:2012 Edition 4.1 and is entitled “Food safety management – requirements for prerequisite programmes (PRPs)”. This standard sets out the necessary “good practices” for the handling of food from primary production to the final consumer in such a way that the safety of the customer is ensured. This standard is considered as the pre-requisite programme for a HACCP system and thus must be in place before the implementation of HACCP can be considered. A pre-requisite programme can be defined as “basic conditions and activities that are necessary to maintain a hygienic environment throughout the food chain suitable for the production, handling and provision of safe end food products and safe food for human consumption” (SANS 10049:2012, p8).

The second standard referred to is SANS 10030:2007 Edition 2.1 and is entitled “Requirements for a hazard analysis and critical control point (HACCP) system”. This standard describes the principles of control needed to ensure the supply of safe foods to the consumer.

These two standards have been widely adopted in South Africa and together with Regulation 962, are regarded as the industry standard and “good practice” in the food industry. Many food manufacturers and food service operators have implemented these standards as a means of providing food safety confidence to consumers and as a standard against which to have their operation audited.

The next section will discuss HACCP and ISO 22000 in more detail, particularly with reference to the use of these two food safety management systems in hospital food service.

2.4.3 Hazard Analysis Critical Control Point in hospital food service

The HACCP system is an internationally recognised food safety management system that was introduced in the 1960s. It is a system which has the ability to identify potential food safety hazards before they occur and is used to control the risks of contamination by food-related hazards (Gikas *et al* 2007).

Table 2.1, adapted from Griffith (2006), gives a history of the origins and development of the HACCP system worldwide. The origins of the HACCP system lie in the space aviation industry when HACCP was first developed by the Pillsbury Corporation for the National Aeronautics and Space Administration (NASA) of the USA government to ensure food safety for the first manned space mission (Griffith 2006). NASA wanted a “zero defects” system that would assure the safety of the food to be consumed by astronauts in space against contamination by bacterial or viral pathogens, toxins and chemical or physical hazards that could cause illness or injury (Domenech, Eseriche & Martorell 2008). Despite the development of HACCP in the 1960s, HACCP was only extensively implemented in the early 1990s and has since been slowly incorporated by regulatory agencies into food safety regulations worldwide (Surak 2007; Griffith 2006). Today, HACCP is recognised by the FAO and WHO as an effective method for controlling food safety (Ropkins & Beck 2000).

Table 2.1: History of HACCP – HACCP origins and development (after Griffith 2006)

Date	HACCP Development
1960s	Pillsbury/USA Army Natick Lab/NASA.
1971	USA national conference on food protection (1 st mention of HACCP).
1973	Federal Drug Administration regulation low acid canned food. Recommended use of HACCP.
1985	National Academy of Science report on HACCP.
1989	National Advisory Committee of Microbiological Specification for Food (NACMSF) document endorsing HACCP approach.
1991	Codex HACCP draft.
1992	NACMSF document on HACCP.
1993	EU Commission 93/43/ECC Recommended use of 5 HACCP principles Codex 1993 guidelines.
1995	5 HACCP principles mandatory in EU.
1996	Pennington Report (Scotland) recommends HACCP be adopted by all food businesses.
1997 to 22000	HACCP mandatory in USA food industries – seafood, red meat, poultry.
22000	HACCP mandatory for UK butcheries.
2002	On-going application of HACCP principles to catering e.g. Safe Catering in Northern Ireland.
2006	Legal requirement to apply HACCP in food businesses across EU.
2006+	Increased worldwide use of HACCP in food safety legislation.

HACCP consists of five preliminary steps and seven principles and these steps and principles together are known as the HACCP plan. The first step is the assembly of a food safety team who are appointed by management. The team identifies the food safety hazards most likely to occur in a specific food product during each step of the manufacturing process. Next, the food safety team determines the likelihood of the occurrence of the hazards and their severity, and establishes critical limits and corrective actions for each step to reduce or eliminate the identified hazard. Finally, procedures are established for verification of the critical limits, documentation and record keeping (Surak 2007). Table 2.2 gives the five preliminary steps and seven principles of HACCP, or the HACCP plan.

Table 2.2: The five preliminary steps and seven principles of HACCP (after Surak 2007)

Step	Description
Preliminary step one	Assemble the HACCP team.
Preliminary step two	Describe the product.
Preliminary step three	Identify intended use of the product.
Preliminary step four	Construct a flow diagram.
Preliminary step five	Conduct an on-site verification of the flow diagram.
Principle one	Conduct a hazard analysis.
Principle two	Determine critical control points (CCP's).
Principle three	Establish critical limits for the CCP's.
Principle four	Establish a monitoring system for the CCP's.
Principle five	Establish corrective actions.
Principle six	Establish validation and verification procedures.
Principle seven	Establish documentation and record keeping procedures.

In a review of worldwide approaches to the use of HACCP, Ropkins and Beck (2000) reported that HACCP principles have been incorporated into the food safety legislation of the USA, Canada, Australia, New Zealand, The Netherlands, Germany and the UK. Since the January 2006, the European Parliament has made it compulsory that all food business operators of member states establish and implement food safety programmes based on the HACCP principles (Domenech *et al* 2008). In developing countries, HACCP has been difficult to implement due to a number of limitations and problems such as education and training, language difficulties and availability of local food safety hazard information (Ropkins & Beck 2000).

The principles of the HACCP system can be considered for all food chain sectors from “farm to fork” to ensure food safety (South African National Standard 10330:2007). The system and guidelines for its application have been defined by the Codex Alimentarius Commission in the 2003 Codex standard “General Principles of Food Hygiene”.

In South Africa, Regulation 908 of the Foodstuffs, Cosmetics and Disinfectants Act, 1972 (Act 54 of 1972) was published on the 27th of June 2003. This regulation is entitled “Regulations relating to the application of the hazard analysis and critical control point

system (HACCP system)” and describes the requirements for a HACCP system for the food industry. This regulation has to date not been legislated and the HACCP system is therefore not a legal requirement for the food industry in South Africa.

For HACCP to be effective, it must be compatible with the products being sold or prepared, the consumer and the facilities as well as the equipment used during food production (Sun & Ockerman 2005). As already discussed, hospitalised patients are particularly at risk for food borne infections and the consequences of a food borne outbreak in a hospital would have catastrophic consequences. HACCP is an ideal tool for food hygiene practices and infection control in a hospital setting (Shih & Wang 2011).

2.4.3.1 Benefits of HACCP implementation

South African researchers Hanekom, Vermeulen and Oldewage-Theron (2010) state that a “formal programme for promoting and maintaining food safety is essential in any setting where immune-compromised patients are cared for” (Hanekom *et al* 2010). Hanekom *et al* (2010) conducted a study in a food service unit of a private hospital in Gauteng, South Africa to investigate the hygiene and food safety status of the unit serving low microbial diets to immune-compromised patients. The investigation was done using an audit form based on HACCP principles in different areas of the unit. Four random food samples and four random surface swabs were taken and sent for microbiological analysis. The results of the audit and microbiological testing were used to evaluate possible food safety risks in the unit according to internationally approved HACCP standards. The results of the study revealed several food safety contraventions as well as high microbial counts on several of the samples and swabs. This highlighted the fact that even though food safety procedures were reported to be in place in the unit, they were not followed. Hanekom *et al* (2010) concluded that the HACCP system is an ideal, proactive approach to ensure food safety in a hospital food service unit and is essential for the production of hygienically safe food. This supports the research conducted by Lund & O’Brien (2009) who reported that most food borne outbreaks in healthcare facilities could have been prevented by good hygiene practices and HACCP.

Nosocomial infections, also known as hospital-acquired infections, are infections acquired by patients within a hospital setting (Lee & Greig 2012). Nosocomial infections are reported to be a common problem, that result in an increased length of hospital stay and hospital costs as well as affecting survival rates and the patients’ response to treatment (Lazarevic, Stojanovic,

Bogdanovic & Dolicanin 2013). Nosocomial infections may be transmitted in various ways and one of the routes of transmission within a hospital environment is incorrectly prepared and contaminated food (Lee & Greig 2012). In a study to evaluate the effects of food safety training of food handlers on the microbiological quality of hospital food, Lazarevic *et al* (2013) reported that the food safety training of food handlers not only improved food safety knowledge, but also significantly decreased the bacterial count of swabs taken from the food handlers hands and clothing, work surfaces, equipment and food preparation utensils. The researchers concluded that the implementation of HACCP with continual food safety training will contribute to the reduction of nosocomial infections in hospitals (Lazarevic *et al* 2013). Recommendations for prevention of foodborne nosocomial infections given by Lee and Greig (2012) include training of the food handlers, monitoring of food temperatures, extra precautions for vulnerable patients and effective hand washing, all of which form part of the pre-requisites for a HACCP system (Lee & Greig 2012).

The benefits of a HACCP system in a hospital food service facility were realised 20 years ago after HACCP was implemented by a Hospital Food Hygiene Committee in the UK. After the system had been in operation for three months, an audit was conducted to evaluate the benefits that had been achieved. The results of the audit showed the following benefits of the HACCP system: A high degree of involvement of all levels of staff, increased staff motivation regarding food safety and better working relationships with government environmental health officers (Richards *et al* 1993).

Osborn *et al* (1997) conducted a nationwide survey in the USA to identify the status and trends of HACCP programmes in 177 hospital food service facilities. Even though this survey was done over 15 years ago, the results were encouraging as it was found that the majority of hospital food service facilities had implemented or were planning to implement HACCP programmes in the near future (Osborn *et al* 1997). Benefits of the HACCP system in hospital food service has been reported in more recent research conducted in Iran, Turkey, Spain, Taiwan, Greece and the UK. The benefits reported included improved patient satisfaction, a decrease in complaint rates, prevention of food poisoning episodes, the avoidance of unnecessary costs and increased consumer confidence (Farzianpour *et al* 2014; Uyar *et al* 2012; Rodriguez, Valero, Carrasco, Pérez-Rodríguez, Posada & Zurera 2011; Shih & Wang 2011; Gikas *et al* 2007; Griffiths 2006;).

2.4.3.2 Barriers to HACCP implementation

Many studies have reported that obstacles are often encountered when implementing the HACCP system into a hospital food service facility. Shih and Wang (2011) investigated the barriers that may influence HACCP implementation in Taiwanese public hospital kitchens (Shih & Wang 2011). Catering managers in 23 hospitals participated in the study, by completing a questionnaire concerning the difficulties and benefits of HACCP implementation. It was found that many food service staff do not understand the system and therefore have a fear of implementation, highlighting the need for intensive training for all levels of food service staff on the HACCP principles and its benefits. Other possible factors affecting HACCP implementation as reported by Shih and Wang (2011) were the provision of adequate funding as well as gender, age and job position of food service staff. Female staff were more positive about HACCP implementation compared to male staff and it was suggested that this may be because females pay more attention to detailed cleaning and hygiene than males. Older staff members and those in lower job positions experienced lower levels of job satisfaction compared to younger, more senior employees and this negatively impacted on their motivation to be involved in the HACCP implementation process (Shih & Wang 2011). Similar findings were reported by Garayoa, Vitas, Diez-Leturia and Garcia-Jalon (2011) who investigated effective HACCP implementation specifically within contract catering companies in Spain and reported lack of staff training and motivation as well as lack of financial and economic resources as difficulties to the effective implementation of HACCP systems (Garayoa, Vitas, Diez-Leturia & Garcia-Jalon 2011).

The study by Shih and Wang (2011) also found that amongst foodservice management, the level of difficulty of HACCP implementation was lower than expected. Managers initially had little confidence in receiving support, funds and resources from the hospital management, however it was found that support and training had been provided which had assisted in the implementation process (Shih & Wang 2011). Managerial attitudes towards the HACCP system was investigated in Hungary by Banati and Lakner (2012) and it was found that 41% of foodservice managers had a reluctant attitude towards HACCP, due to fear of increased administrative burden and added costs. These results highlighted the importance of an integrated approach to HACCP in managerial responsibilities in an effort to acknowledge the benefits of HACCP for better organisation of the facility (Banati & Lakner 2012).

The need for basic food safety and food hygiene training for food service staff is of vital importance, before the implementation of any food safety management system, including HACCP. Although many food service staff may realise the importance of food safety in a hospital environment, their attitudes and food hygiene practices are often lacking. This was a common finding in studies conducted in Turkey, Italy, Spain and Greece (Rodriguez, Valero, Carrasco, Pérez-Rodríguez, Posada & Zurera 2011; Tokuç, Ekuklu, Berberoğlu, Bilge & Dedeler 2009; Gikas *et al* 2007; Ayçiçek, Aydoğan, Küçükkaraaslan, Baysallar & Başustaoğlu 2004; Angelillo *et al* 2001).

Aycicek *et al* (2004) emphasised the importance of training for food service staff after a study done to determine the level of bacterial contamination on the hands of food handlers revealed unacceptable levels of contamination on both the bare and gloved hands of food handlers in the kitchen of a military training hospital in Turkey. The researchers concluded that training in personal hygiene and food safety should be improved in hospital food service facilities and inexperienced staff should not be employed without being well trained (Ayçiçek *et al* 2004). Effective hand washing was also highlighted as a recommendation by Lee and Greig (2012), after a review of bacterial food borne outbreaks in hospitals (Lee & Greig 2012). When nursing staff and domestic hospital staff are involved in food service functions, they should also undergo thorough and intensive food safety training (Buccheri *et al* 2007) as it has been reported that compliance with hand hygiene in the overall hospital setting is generally low (van der Vegt & Voss 2009).

A similar survey to investigate the degree of compliance to food safety and difficulties existing during HACCP implementation was undertaken in Crete, Greece by Kokkinakis *et al* (2011) in seven hospital food service units. Some of the factors found to affect successful implementation were lack of managerial support, insufficient food service staff training, food storage conditions, lack of HACCP certified suppliers of raw products, difficulty in the integration of HACCP with other hospital processes and lack of involvement by public health authorities. Interestingly the importance of the involvement of hospital dietitians in HACCP implementation was emphasised, especially with regards to menu planning and the inclusion of foods considered being “high risk” for consumption by immune-compromised patients. The involvement of the hospital dietitian is also important in the role that HACCP can play in the prevention and management of hospital malnutrition (Kokkinakis *et al* 2011). The involvement of the dietitian was discussed by Mershon (2014), who suggests that the role of

the hospital dietitian should extend beyond nutrition care to include HACCP, food safety training as well as planning, problem solving and food safety auditing (Mershon 2014).

The HACCP system was strengthened in 2005 by the development of ISO 22000, an international food safety management system entitled “Food safety management systems – Requirements for any organisation in the food chain”. ISO 22000 incorporates all of the HACCP preliminary steps and principles and goes a step further by defining management responsibility and using a systems approach to prevent new hazards from entering the food production process (Surak 2007). The following section will cover ISO 22000 and its application in a healthcare setting.

2.4.4 ISO 22000 in hospital food service

The International Organization for Standardization (ISO) is a network of national standards bodies founded in 1947. ISO is the world’s largest developer of voluntary international standards and have published more than 19 500 international standards covering all aspects of technology and business, including food safety. International standards ensure that products and services are safe, reliable and of good quality (International Organization for Standardisation 2013).

The ISO standard ISO 22000:2005 specifies the requirements for a food safety management system, where an organisation in the food chain needs to demonstrate its ability to control food safety hazards, in order to ensure that food is safe at the point of human consumption. It is applicable to all organisations, regardless of size, that are involved in any aspect of the food chain and would like to implement systems that consistently provide safe food. It is a management tool, used to protect the food supply chain and production processes against microbial, chemical and physical hazards and contamination (International Standards Organization 2005).

ISO 22000 was published in September 2005. Up until this point, the HACCP system was the internationally accepted approach for developing a food safety management system. However, HACCP did not give sufficient emphasis to the management of the system, hence the development of ISO 22000 which incorporates HACCP and ISO 9001:2000 (Uyar *et al* 2012). ISO 9001 specifies the requirements for a quality management system where an organisation:

- “needs to demonstrate its ability to consistently provide a product/products that meet customer and applicable regulatory requirements,” and;
- “aims to enhance customer satisfaction through the effective application of the system, including processes for continual improvement of the system and the assurance of conformity to customer and applicable regulatory requirements” (International Standards Organization 2008).

ISO 22000 can therefore be seen as “bridging the gap” between HACCP and ISO 9001 (Uyar *et al* 2012). ISO 22000 derives much of its structure and content from HACCP, integrates all of the HACCP principles as well as basic good hygiene practices and prerequisite programmes for food safety, as outlined in SANS 10049:2012. While HACCP is inherently a system to prevent food safety hazards; ISO 22000 recognizes that new food safety hazards emerge and new technologies to control food safety hazards are developed. Therefore ISO 22000 uses a systems approach to prevent new hazards from occurring (Surak 2007). ISO 22000 involves the implementation of an operational prerequisite programme which places emphasis on the essential hazards identified in the hazard analysis, in order to reduce the likelihood that food products will be exposed or contaminated or that hazards will proliferate (Arvanitoyannis & Kassaveti 2009, p25). Table 2.3 gives the general structure of the ISO 22000 system and the elements involved in its implementation.

Table 2.3: The general structure of ISO 22000:2005 (after Surak 2007)

Element	Description
One	Establish a food safety management system: <ul style="list-style-type: none"> • General requirements. • Control of documents and records.
Two	Management responsibility: <ul style="list-style-type: none"> • Management commitment. • The food safety policy. • Planning of the food safety management system. • Responsibility and authority. • The food safety team leader. • Establish communication channels, both external and internal. • Emergency preparedness and response. • Management review.
Three	Resource management: <ul style="list-style-type: none"> • Provision of resources. • Competence, awareness and training. • Infrastructure. • The work environment.
Four	Planning and realisation of safe products: <ul style="list-style-type: none"> • The prerequisite programmes. • The five preliminary steps to enable hazard analysis. • Establishing the operational prerequisite programmes. • The seven principles of HACCP. • The traceability system. • Control of non-conformity, handling of potentially unsafe products and recalls.
Five	Improvement of the food safety management system: <ul style="list-style-type: none"> • Auditing and analysis of audits and verification activities. • Continual improvement programmes. • Updating and review of the food safety management system.

As ISO 22000 focuses on quality and customer satisfaction as well as food safety, the adoption of this system in the foodservice facility of a hospital is expected to enhance the patient experience and lead to improvement in patient satisfaction levels. Furthermore, ISO 22000 leads to the retention of food quality and the nutritional value of the food thereby improving the outcome of the patient (Uyar *et al* 2012).

Only one study could be found in the literature on ISO 22000 implementation in a hospital food service facility. This study was conducted in Turkey by Uyar *et al* in 2012. The objectives of this study were to determine the differences in patient satisfaction before and

after ISO 22000 implementation and to determine the factors affecting satisfaction levels with the hospital food and food service (Uyar *et al* 2012).

The study was carried out in a university hospital in two stages; before ISO 22000 implementation (226 participants) and after ISO 22000 implementation and certification (240 participants). The participants, who were patients from different clinics in the hospital, were asked to complete a questionnaire consisting of three sections. The first section gathered information on the demographic characteristics of the patients, the second section determined the level of satisfaction of the food service and the third section determined the level of satisfaction with the food quality. The questionnaire used a 5 point rating scale and was administered by students of the Department of Nutrition and Dietetics at the same university by means of an interview process with each patient.

The following aspects of the food and food service were reported to improve after ISO 22000 implementation: appearance of food, taste of food, freshness of salads, freshness of fruit, quantity of food provided, variety of food provided, timing of meal services and cleanliness of staff. No statistically significant improvement was found for the viscosity of food, temperature of food, cleanliness of crockery and cutlery, or the attitudes and behaviour of service staff.

Uyar *et al* (2012) reported that the improvements found were due to the implementation of standardised systems during all stages of the food production, from purchasing of the raw materials to the final service to the patient. Despite some aspects of the food and food service not having shown significant improvements, Uyar *et al* (2012) concluded that ISO 22000 improves not only food quality but also organoleptic properties of the food, menu and service specifications as well as increasing the overall satisfaction scores of hospitalised patients.

2.5 Summary

The provision of enjoyable, nutritious and safe food for vulnerable people in healthcare settings, involves a systematic approach to the measurement and improvement of patient satisfaction levels and the adoption of internationally recognised food safety systems.

Patient satisfaction with the hospital food and food service may affect their food intake, morale and well-being, and contribute to the overall patient satisfaction level with the entire

hospital experience. Furthermore, food is a vital part of treatment to prevent malnutrition and speed up recovery. Outbreaks of food borne illness in hospitals and healthcare facilities can result in serious illness, wastage of expensive medical treatment, spread of infection to other patients and hospital staff as well as disruption of services (Lund & O'Brien 2009).

There is a need to implement recommendations from literature and explore further strategies to prevent hospital related malnutrition and food borne infections. Lack of knowledge surrounding the use of ISO 22000 both as a food safety protocol and as a contributor to patient satisfaction levels exists in healthcare settings both internationally and in South Africa. This study aims to determine the impact of ISO 22000 implementation on patient satisfaction levels and its effect on the safety of the food provided in a South African hospital. This is important in order to determine the viability of such a system in the South African healthcare environment, and its effectiveness on both patient satisfaction and food safety.

This chapter provided the theory behind this study and what other research has been conducted surrounding this topic. This study aims to further contribute to the lack of knowledge in the area of ISO 22000 in hospitals foodservice departments. The next chapter will describe the various methods used by other researchers and the most appropriate method chosen to achieve the objectives of this study.

CHAPTER 3: METHODODOLOGY

This chapter will cover the methodology including the following: study design, the study population and sample selection, study methods and materials, data collection, methods of data analysis, the pilot study as well as the ethical considerations.

3.1 Study design

According to Zikmund (2000), the study design is the master plan that specifies the methods and procedures for collecting and analysing the information needed to meet the stated objectives (Zikmund 2000, p65). Research can be done employing either quantitative techniques or qualitative techniques or a combination of both of these techniques.

Quantitative research techniques use numbers to describe what exists (Gray, Williamson, Karp & Dalphin, 2007, p42) and is defined by Coldwell and Herbst (2004) as “a technique that involves the collection of primary data from large numbers of individual units with the intention of projecting the results to a wider population” (Coldwell & Herbst 2004, p46-47). Quantitative research provides an exact approach to measurement (Zikmund 2000, p103). A major advantage of this research technique is that data can be fed into a computer where it can be counted, stored and manipulated (Gray *et al* 2007, p42).

Qualitative research is subjective in nature and uses techniques that rely on words and observations that tell a story or convey a message (Gray *et al* 2007, p42; Zikmund 2000, p103). The advantage of qualitative research is that it captures subtleties and meanings that numbers do not convey. A disadvantage of qualitative research is that it is not easy to replicate a qualitative study for comparison purposes as it is difficult to re-create the exact conversations and observations that form the basis of this research method. Qualitative research is also typically more time consuming than quantitative research (Gray *et al* 2007, p42).

Many researchers are using a combination of quantitative and qualitative research methods in the same study to reap the benefits of both as well as minimise the short comings of each method (Gray *et al* 2007, p42). This study used both quantitative and qualitative methods. The quantitative aspect of the study employed the analysis of primary data including information collected and analysed specifically for the research project at hand. The

qualitative aspects of the study included the opinions of the study population that were surveyed.

This study was a cross-sectional study as different participants were involved at each survey. A cross-sectional study is a study in which various segments of the sample population are sampled at a single point in time (Zikmund 2000, p178). An advantage of a cross-sectional study is that it has the virtue of producing prompt results and such a study can be completed in several hours (Gray *et al* 2007, p46). This study consisted of four surveys conducted approximately three months apart over one year during which the ISO 22000 system was implemented into the catering department of a private hospital facility. Although this study involved four surveys and took place over a period of time, different patients were present at each survey. The first survey conducted was considered to be the baseline survey as it was done before ISO 22000 implementation. The last survey was conducted after the completion of ISO 22000 implementation.

This study used surveys to obtain information. Survey-based research design seeks to obtain information from a limited number of individuals who are presumed to have the information the researcher is seeking, who are able and willing to communicate and who are representative of a larger group (Hofstee 2011, p122).

3.2 Study population and sample selection

This section will discuss the location in which the study took place as well as the methods used to select the sample population.

3.2.1 Study population

This study was conducted at a private hospital facility, the Hibiscus Private Hospital in Port Shepstone, KwaZulu-Natal. The primary reason for selecting this particular facility was that the hospital management had requested that the contract catering company implement a food safety management system such as ISO 22000. This provided an ideal opportunity to study the patient satisfaction levels with the food and food service as well as the results of food safety audits before, during and after the implementation of ISO 22000.

The Hibiscus Private Hospital is a 104 bed hospital with maternity, surgical, medical, paediatric and intensive care wards. A contract catering company provides the entire food

service from procurement and delivery of the raw ingredients to the final service of the finished product to the patient. All meals and snacks for patients are prepared and cooked in the hospital kitchen using the conventional method of food preparation. Once prepared, food is plated in the kitchen and delivered in a heated food trolley to the ward by a ward hostess. The ward hostess is responsible for looking after all the catering needs of the patient.

An independent food safety auditing company is contracted by the hospital management to do third party food safety audits in the foodservice unit and wards, approximately every three months. The results of these audits are shared with hospital management and management of the catering company. The first audit conducted was considered to be the baseline audit as it was done before ISO 22000 implementation began. The final audit was conducted after the completion of ISO 22000 implementation. The researcher is currently an employee of the contract catering company and therefore had access to the wards, the catering department and the food safety audit results.

3.2.2 Study sample

Sampling is defined by Gray *et al* (2007) as “the selection of a relatively small group of individuals from whom we obtain data in order to be able to generalize about a larger group” (Gray *et al* 2007, p102). This study used a convenience nonprobability method of sample selection. A nonprobability sample is a technique in which the subjects sampled are selected on the basis of personal judgement or convenience. Convenience (also known as accidental or haphazard) sampling is the procedure used to conduct research amongst subjects that are most conveniently available (Zikmund 2000, p350).

3.2.3 Inclusion and exclusion criteria

This study included patients from the maternity, surgical and medical wards that were willing and able to participate in the study on the days that the researcher collected data. Patients must have eaten at least one meal provided by the hospital foodservice department in order to participate. Patients with notable physical, cognitive or emotional limitations as determined by the ward nursing manager, as well as those receiving enteral or parenteral nutrition in these wards were excluded. Patients in the paediatric ward and ICU were excluded from this study based on their inability to evaluate the quality of the food service.

One patient indicated that they had been in hospital on two occasions when the surveys were being conducted. As questionnaires were completed anonymously, it was not possible to determine which questionnaires were completed by this patient and therefore all completed questionnaires were included in the results.

3.3 Study methods and materials

3.3.1 Methods available for measuring patient satisfaction

A review of the literature reveals various methods that can be used for measuring patient satisfaction with healthcare services and hospital food service. These include questionnaires, telephone interviews, opinion or comment cards, electronic patient satisfaction surveys and group interviews. This section will briefly discuss these different methods as well as the method selected for use in this study.

3.3.1.1 Questionnaires

Questionnaires are the most popular tool used for measuring patient satisfaction. Some questionnaires such as the Acute Care Hospital Foodservice Patient Satisfaction Questionnaire (ACHFPSQ) have been validated as reliable measurement method, while others have been formulated by other researchers specifically for the purpose of their study.

The ACHFPSQ was developed in 2005 by Capra *et al* (2005). This involved a six year study of 2347 patients in two Australian hospitals with the aim of developing a valid and reliable tool to measure patient satisfaction with acute care hospital food services and to assist food service managers in identifying specific areas for improvement (Capra *et al* 2005). The final ACHFPSQ questionnaire contained 16 statements grouped into four dimensions of patient satisfaction with food service: food quality, meal service quality, staff/service issues and the physical environment. These statements were developed through reference to published literature (Dube *et al* 1994; Gregoire 1994; DeLuco & Cremer 1990). Patients were also able to make written comments on the questionnaire and socio-demographic information was obtained. The results indicated that the ACHFPSQ was a reliable, accurate measure of patient food service satisfaction which could be effectively used in hospital food service departments (Capra *et al* 2005).

Fallon *et al* (2008) used the ACHFPSQ to measure and monitor trends in patient satisfaction as well as identify areas for quality improvement (Fallon *et al* 2008). They found that an

advantage to using the ACHFPSQ was that it was practical to administer and could be successfully used to detect specific food quality issues thereby identifying areas for quality improvement.

Studies conducted on patient satisfaction with hospital food services using the ACHFPSQ by Porter and Cant (2009) and Wright, Connelly and Capra (2006) further validated the ACHFPSQ as a reliable, accurate measure of patient food service satisfaction. Porter and Cant (2009) found that due to the inclusion of short, simple questions, the ACHFPSQ was able to reliably measure various aspects of patients' satisfaction with hospital foodservice.

Other questionnaires used by researchers to measure patient satisfaction with overall health care services include the Questionnaire of Patient Satisfaction in Serbia (Vuković *et al* 2012), the Patient Experience Questionnaire in Norway (Garratt, Helgeland & Gulbrandsen 2011), the Resident Foodservice Satisfaction Questionnaire for geriatric/rehabilitation and residential aged care in Australia (Wright, Connelly, Capra & Hendrikz 2011), the Parkside Inpatient Questionnaire and the Wesley Hospital Foodservice Patient Satisfaction Questionnaire in Australia (Wright *et al* 2003), the External Patient Satisfaction Survey in the USA (Dufrene 2000) and the Patient Satisfaction Questionnaire in Canada (Hudak & Wright 2000).

A questionnaire that is commonly used in the USA is the Press Ganey Patient Satisfaction Questionnaire (PGPSQ). Press Ganey is a recognised leader in healthcare patient satisfaction in the USA that supports healthcare providers in understanding and improving the entire patient experience (Tranter *et al* 2009). The PGPSQ contains thirty six standard questions evaluating three aspects of meals namely the quality of food, the temperature of food and the courtesy of the person serving the food. The PGPSQ has been successfully used as a research instrument in studies examining the quality of food and nutrition services in hospitals (Tranter *et al* 2009; Lau & Gregoire 1998).

3.3.1.2 Telephone interviews

Telephone interviews with patients after discharge from hospital have been used by some researchers as a method of gathering data on patient satisfaction with hospital food services and overall hospital care. Otani *et al* (2012) conducted a study in the USA to determine how seriously ill patients differ from less seriously ill patients with regards to their satisfaction levels. A telephone based survey of 32 053 discharged patients was conducted by a national

telephone survey company specializing in patient satisfaction measurement. Approximately 25 000 patients were willing to complete the survey telephonically (Otani *et al* 2012). The research questions in another American study by DeLuco *et al* (1990) were answered through a telephonic survey of 223 post discharge patients. In this instance, an introductory letter was first mailed to the sample group five days in advance of the telephone contact (DeLuco & Cremer 1990). A disadvantage of using telephone interviews to measure patient satisfaction is that this method relies on retrospective information that may be affected by the patients' memory and a certain amount of detail may have been forgotten (Ford, Bach & Fottler 1997). Other disadvantages as reported by Ford *et al* 1997 include patients regarding telephone interviews as intrusions on their private time and patients becoming weary by lengthy interviews leading to responses that are unreliable. An advantage of telephone interviews is that they allow the interviewer to ask probing questions during the interview to obtain more detail about the patients' experience.

3.3.1.3 Consumer opinion cards

Another method of measuring patient satisfaction with hospital care and hospital food service is with the use of consumer opinion cards. Consumer opinion cards have been reported as an inexpensive method for measuring patient satisfaction and rely on voluntary respondent participation. Patients are asked to indicate their satisfaction level using a very simple rating scale or "smiley faces", a space is usually provided for written comments and cards are returned by placing them in a convenience box or by mail. A disadvantage of using consumer opinion cards is that typically, only a very small percentage of cards are returned, usually by those patients that were either elated or very dissatisfied with the hospital service (Ford *et al* 1997). Hartwell and Edwards (2001) made use of consumer opinion cards with questions that concentrated on the quality indicators of food namely temperature, flavour, portion size and texture as well as asking the patient for their overall opinion of the hospital food (Hartwell & Edwards 2001).

3.3.1.4 Electronic patient satisfaction surveys

Ilioudi, Lazakidou and Tsironi (2013) recommend the use of electronic surveys to reach more patients and increase the number of surveys returned. Surveys can be sent via email to the patient the day after the patient is discharged from the health care facility. As this method of measuring patient satisfaction has the ability to survey more patients than other methods, the cost per returned survey is lower and the ability to get feedback is faster and greater.

Additional advantages of electronic surveys are convenience for the respondent as surveys can be completed in their own time; respondents may also be more willing to share personal or sensitive information as they are not disclosing it directly to another person. Disadvantages of this method are that certain populations have limited access to the internet, and the lack of a trained interviewer to clarify and probe can possibly lead to less reliable results. Harewood, Yacavone, Locke and Wiersema (2001) reported that although the dramatic growth of the internet holds potential for use in survey distribution for the purposes of measuring patient satisfaction, comparisons of electronic surveys, either online or via email, to traditional survey techniques are lacking.

3.3.1.5 Focus group interviews

Hartwell, Edwards and Symonds (2006) used both focus group interviews and individual interviews with hospital patients and staff to explore the factors related to patient satisfaction. Focus groups bring patients together after they have been discharged from hospital, to discuss their experiences with the service in the form of a group discussion. Ford *et al* (1997) reported several disadvantages with this method of measuring patient satisfaction; including that they are expensive, time-consuming and labour-intensive. Although the outcome of the study by Hartwell *et al* (2006) met the objectives, both the group interviews and the individual interviews took approximately half an hour to conduct indicating that this method of measuring patient satisfaction is a lengthy one (Hartwell, Edwards & Symonds 2006).

3.3.1.6 The measuring instrument chosen for this study

After careful consideration of these methods as well as the objectives of this study, the researcher decided to use a questionnaire as the method of data collection in this study. The questionnaire used in this study was developed by the researcher and was based on the ACHFPSQ, as this has been validated by several researchers as a reliable method of measuring patient satisfaction with hospital food and food service. The choice of questions, the rating scale and the layout of the questionnaire were based on the ACHFPSQ. The questionnaire used is shown in Appendix A, p111-113.

Effective questionnaires should focus on the wording of the questions, the sequence in which the questions are arranged, the general appearance of the questionnaire and the manner in which the questionnaire is pre-tested and subsequently revised (Zikmund 2000, p332). The

content of specific questionnaire items should be determined by the goals of the research project (Gray *et al* 2007, p130).

The first part of the questionnaire used in this study contained a general section to collect demographic information about the patient, including age, gender, length of hospital stay and type of diet. The last part of the questionnaire, which was the qualitative aspect of the study, provided an opportunity for the patient to write comments regarding the food and food service. It was found in a study by Tranter *et al* (2009) that written patient comments provide food service managers with detailed and specific information to identify concerns that cannot be determined from simple satisfaction rating questions alone.

The body of the questionnaire, developed for use in this study, consisted of four sections with subheadings as follows:

- Section 1: Satisfaction with the temperature of the food.
- Section 2: Satisfaction with hygiene and cleanliness.
- Section 3: Satisfaction with food quality.
- Section 4: Satisfaction with the service of the food.

Subheadings were utilised to ensure that the different aspects of food quality, food safety and the service of the food were covered in the overall determination of the levels of patient satisfaction.

The wording of the questions along with their format and context can significantly influence the results obtained (Schwarz 1999). In each section of the questionnaire used in this study, questions were kept short and simple. The entire questionnaire used was designed to be as brief as possible to prevent patient fatigue whilst still being able to gather sufficient information regarding the patients' satisfaction levels with the hospital food and food service. In the body of the questionnaire, closed questions were used as opposed to open-ended questions to ensure that the meaning of each question was clear and to prevent any misinterpretation of the question by the patient. Closed questions minimise differences in question interpretation whereas open-ended questions elicit a variety of responses that are often difficult to analyse (Gray *et al* 2007, p132-133). Generally, closed questions are easier to answer than open-ended questions (Gray *et al* 2007, p133). Questions selected for use in each section were developed through reference to published literature, particularly the ACHFPSQ. Certain questions were adapted in order to meet the specific objectives of the

study and several questions relating to food safety were included to meet the food safety objective of the study. All questions, except the final section of the questionnaire where patients were asked to give written comments, made use of closed-ended questions to keep the questionnaire simple and tidy and to minimise confusion.

The majority of patient satisfaction surveys that have been conducted in the past ten years have made use of questionnaires employing a response scale based on the Likert scale. Allen and Seaman (2007) describe Likert scales as scales that range from a group of categories - least to most - asking people to indicate how much they agree or disagree, approve or disapprove, or believe to be true or false (Allen & Seaman 2007). Weijters, Cabooter and Schillewaert (2010) reported that questionnaires using Likert-type rating scales are an important source of data in marketing research (Weijters, Cabooter & Schillewaert 2010). It has been shown that simple yes/no question responses yield falsely high satisfaction rates when compared with questions employing a Likert-type response scale (Heidegger *et al* 2006). The Likert scale is defined by Zikmund (2000) as “a measure of attitudes ranging from very positive to very negative, designed to allow respondents to indicate how strongly they agree or disagree with carefully constructed statements relating to an attitudinal object” (Zimund 22000 p291).

There are several studies that have investigated the ideal scale format and scale number of responses for questionnaires. Garratt *et al* conducted a study in 2011 to assess the data quality using both a 5-point and 10-point Likert scale within a patient experience questionnaire. The outcome of this study was that the 5-point scale performed better than the 10-point scale and was therefore more suitable for assessing patient experiences (Garratt *et al* 2011). Similar findings were reported by several other researchers (Vuković *et al* 2012; Ferguson, Capra, Bauer & Banks 2001; Preston & Colman 2000; Ford, Bach & Fottler 1997). Sitzia (1999) conducted an analysis of 195 studies on health service user satisfaction and found that the 5-point scale was the most popular scale in use. With reference to the above-mentioned research, more often than not, rating scales for measuring preference and various qualities of food have been balanced with an equal number of positive and negative intervals and have included a neutral point. In this study, a 5-point Likert-type rating scale with the following options: “very satisfied”, “satisfied”, “neutral”, “dissatisfied” and “very dissatisfied” were used.

3.3.2 Data collection

3.3.2.1 Patient satisfaction surveys

The principle objective of data collection should always be to collect reliable, valid and unbiased data from a representative sample, in a timely manner and within given resource constraints (McColl, Jacoby, Thomas, Soutter, Bamford, Steen, Thomas, Harvey, Garratt & Bond 2001). Data were collected for this study for all patients in the maternity, surgical and medicals wards that consented and were able to complete the patient satisfaction questionnaire on the days that the researcher was present to collect data. Apart from obtaining informed consent, the mental and cognitive state of the patient and whether the patient had consumed at least one meal in the hospital were factors considered when deciding whether the patient was to complete the questionnaire.

The administration of all questionnaires was done by the researcher. The mode of administration was both self-completion and interviewer administration. Evidence from studies provides no consistent picture of the superiority of either of these modes of administration in terms of the quality or quantity of responses received (McColl *et al* 2001). The researcher briefly explained the purpose of the study to the patient and the patient was asked to complete the questionnaire. Those unable to complete the questionnaire by themselves were assisted by the researcher. All questionnaires were collected by the researcher after the patient had completed them. The same questionnaire, Appendix A, p111-113 was used for all four of the surveys conducted.

3.3.2.2 Food safety audits

Food Consulting Services (FCS) is an independent food safety auditing company contracted by the hospital management to do third party food safety audits in the foodservice unit and wards, approximately every three months. Auditors conducting the audits had at least a Bachelor of Science degree in the field of food science or microbiology. The following key result areas were covered in the food safety audit report:

- Microbiological evaluation as per standard FCS protocol.
- Thorough scrutiny of visual cleanliness throughout.
- Full appraisal of food safety practices.
- Investigation of relevant documentation and compliance with the law.

All of the above key areas were quantified into scores or indices, which were weighed based on the risk to food safety. A detailed inspection of the facilities, including design, structural and maintenance issues was also conducted, however these results were not included in the food safety audit results as these fall under the responsibility of the hospital management and not the contract catering company.

The results of the food safety audit were given in two sections, namely the hygiene scores and the microbiological scores; these scores were given as a percentage. The hygiene scores given were for cleaning operations, food safety practices, documentation and an overall hygiene score. The microbiological scores given were the results of the microbiological tests done on surface swabs, hand swabs and food samples taken during the audit. Microbiological testing was done using South African National Accreditation System (SANAS) methods of testing as follows:

- Standard plate count.
- E. Coli and coliform detection.
- Staphylococcus aureus detection.
- Salmonella detection.
- Listeria monocytogenes detection.

The overall microbiological score was calculated on a weighting system according to the total samples tested based on the risk to food safety. The surface swab score shows the percentage of surface swabs uncontaminated out of the total surface swabs tested, and similarly for the hand swabs and food samples. Typical areas where surface swabs were taken during these audits were clean crockery, chopping boards, food preparation tables and utensils, and equipment used during food preparation. Food samples taken for microbiological analysis were as follows: four hot prepared food samples, three cold ready-to-eat or prepared food samples, three dairy food samples and one water or ice sample.

Food safety audits were unannounced and included auditing of the hospital main kitchen, ward kitchens, staff dining area and coffee shop. Audits took approximately 6 hours to complete; the FCS auditor was accompanied during the audit by a management representative from the contract catering company.

Figure 3.1 gives a schematic presentation of the course of the study.

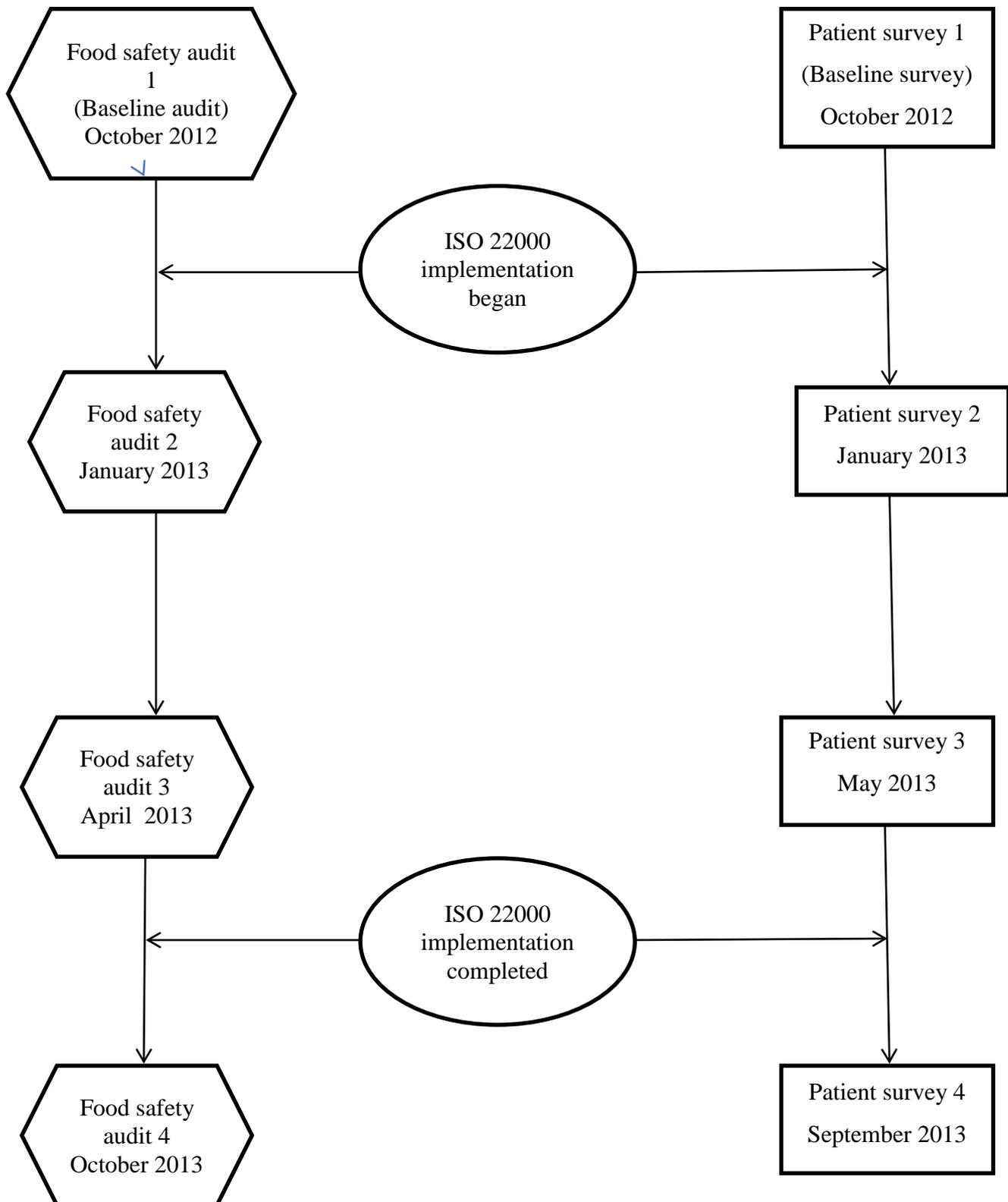


Figure 3.1: Schematic presentation of the course of the study

3.3.3 The process of ISO 22000 implementation

The implementation of ISO 22000 at the hospital where this study was conducted was done by following the standardised structure of ISO 22000:2005 discussed in Chapter 2. Each element of the ISO 22000 system, incorporating HACCP, as described in ISO 22000:2005 was introduced. It is important to note that basic food safety and hygiene procedures or the pre-requisite programme, were already in place before ISO 22000 implementation began, as this is a standard operating practice of the catering company for all of its catering operations.

ISO 22000 is a standard that is applicable to all organisations that are involved in any aspect of the food chain and food production. During the ISO 22000 implementation, some of the elements of ISO 22000 were adapted to suit the nature of the environment and the structure of the catering company, as follows:

- Management commitment was established by forming a senior food safety management team. Members of this team included the managing director, quality assurance manager, operations director, human resources manager and other senior management of the catering company within KwaZulu Natal; each member was assigned, in writing, defined responsibilities and authority relating to food safety.
- A HACCP team was established at the hospital, which included both management and selected members of staff working for the catering company at the hospital. These team members were assigned, in writing, defined responsibilities and authority in accordance with their job description in relation to food safety.
- One of the catering company's employees was on both the food safety management team and the hospital HACCP team to ensure a flow of communication from senior management to the employees at the workplace.
- During the hazard analysis, careful consideration was given to the description of the many different foods products being produced at the hospital, as well as the fact that the food was to be consumed by individuals considered to be at a "high risk" for food poisoning.
- ISO 22000:2005 specifies the use of a recognised method to determine which of the identified food safety hazards should be considered as CCP's. The method most commonly used and described in SANS 10330:2007 and Codex Alimentarius "General principles of food hygiene" (2003), and the method that was used in this

study, is known as the “decision tree”. The “decision tree” used in this study is shown in Appendix B, p114.

Training, externally and internally, with all levels of staff on basic food safety and hygiene, the HACCP principles and the monitoring of the CCP’s, was conducted before and during the implementation process.

3.4 Pilot study

A pilot study involves drawing a very small sample of subjects, conducting interviews or administering questionnaires and noting all the problems that arise (Gray *et al* 2007, p138). This is intended to serve as a guide for the larger study. The data collection methods are usually informal and findings may lack precision because the meticulous standards employed in the larger study are relaxed (Zikmund 2000, p108).

Initially three different questionnaires were developed for this study by the researcher. The format of the questionnaire and the questions in these three questionnaires were the same, however the rating scale responses were different.

The aim of the pilot study was three fold:

- To identify any errors or potential problems due to the design of the questionnaire, wording discrepancies and problems with sentence structure;
- To determine the best rating scale response in terms of simplicity and the ability of the patient to understand and respond to the different rating scale responses;
- To determine the average time required for completion of a questionnaire to enable the researcher to plan the required time period for each survey;
- To determine which of the three questionnaires would be most suitable to achieve the objectives of the study.

The pilot study was conducted at Mediclinic Hospital in Pietermaritzburg. This facility was chosen for the pilot study as the patient demographics are similar to those of Hibiscus Private Hospital and the method of food preparation and distribution is the same in both facilities. The same contract catering company provides the food service, enabling the researcher to have access to both the kitchen and the wards.

The pilot study revealed that the format and length of the questionnaire as well as the questions were suitable and did not require any changes.

Of the three questionnaires initially developed, the one chosen as the final questionnaire contained the following five options: “very satisfied”, “satisfied”, “neutral”, “dissatisfied” and “very dissatisfied”. This rating scale response was chosen as it was the one best understood by patients. This questionnaire was also the questionnaire that took the least time to complete. Another reason for choosing these responses is that they relate to patient satisfaction levels regardless of the patients’ expectations of the hospital food and food service.

3.5 Variables included in the study, data capturing and analysis

Raw data was captured and collated into Microsoft Excel spreadsheets. Statistical analysis was done using the statistical package SPSS (version 21) and Microsoft Excel. Bar graphs, line graphs and tables have been used to depict the analysis of the data that was derived from the raw data collected.

In order to establish any statistically significant relationship between demographics and patient satisfaction with the food and food service, Kruskal-Wallis tests were performed for gender, length of hospital stay and if the patient was on a special diet, against each of the food and food service variables. The relationship between age and each of the food and food service variables was tested by calculating the Pearson sample correlation coefficient and performing a test for zero correlation.

To determine if the ISO 22000 system resulted in any significant improvement in patient satisfaction, Mann-Whitney tests were performed to compare the satisfaction scores of the food and food service variables of Survey 1 with Survey 4.

Table 3.1 details the variables analysed for each objective as well as the method of analysis, parameters and significance used for each objective. One of the advantages of using a questionnaire such as the ACHFPSQ, the questionnaire for which this study was based, is that the value of overall satisfaction can easily be determined using a spreadsheet and simple calculations (Capra *et al* 2005).

Table 3.1: Data analysis

Objective	Variables	Method of Analysis	Parameters and Significance
1. To describe the demographics of hospital patients.	<ul style="list-style-type: none"> • Age • Gender • Length of stay • Type of diet 	Descriptive statistics Cross tabulation	Frequencies
2. To determine the patient satisfaction with the food and food service.	<ul style="list-style-type: none"> • Food temperature • Hygiene and cleanliness • Food quality • Overall catering service 	Descriptive statistics Cross tabulation	Frequencies
3. To determine the relationship between patient demographics and their satisfaction with the food and foodservice.	<ul style="list-style-type: none"> • Age • Gender • Length of hospital stay • Type of diet 	Kruskal-Wallis test Pearson sample correlation coefficient	p value < 0.05 is significant p value between 0.05 and 0.1 is marginally significant ¹ .
4. To determine the impact of ISO 22000 implementation on patient satisfaction with the food and food service.	<ul style="list-style-type: none"> • Food temperature • Hygiene and cleanliness • Food quality • Overall catering service 	Mann-Whitney test	p value < 0.05 is significant p value between 0.05 and 0.1 is marginally significant.
5. To determine the impact of ISO 22000 implementation on the results of food safety audits conducted.	<ul style="list-style-type: none"> • Hygiene scores • Microbiological scores 	Descriptive statistics	Scores are given in percentages. Improvement determined by percentage difference in score from Audit 1 to Audit 4.

¹ It is generally accepted that if the probability level of p value is less than 0.05 then the result is considered statistically significant. A frequently observed convention is that when a significant level falls between 0.05 and 0.10, the result is considered marginally significant (George D & Mallery P (2007). **SPPS for Windows Step by Step A Simple Guide and Reference 14.0 Update**, 7 ed. USA: Pearson Education, Inc.).

3.6 Data quality control

This section will discuss validity, reliability, assumptions and steps taken to reduce bias in the study.

3.6.1 Reliability and validity

“Reliability is the degree to which measures are free from error and therefore yield consistent results” (Zikmund 2000, p280). In this study, reliability was ensured as the same researcher administered the questionnaire and assisted with questionnaire completion where required. Reliability was further ensured by entering the raw data on two separate sheets and comparing the two entries to ensure that there were no input errors or inconsistencies.

“Validity is the ability of a scale or measuring instrument to measure what is intended to be measured” (Zikmund 2000, p281). The questionnaire designed in this study was based on the ACHFPSQ because this has been validated by several researchers as a reliable method of measuring patient satisfaction with hospital food and food service (Porter & Cant 2009; Fallon *et al* 2008; Wright, Connelly & Capra 2006; Capra *et al* 2005). In this study the validity of the measuring instrument was sought by conducting a pilot study, using various versions of the same questionnaire. Based on the results of the pilot study, the most appropriate questionnaire was chosen.

3.6.2 Reduction of bias

The following measures were taken to reduce bias:

- In the event that a patient required assistance with the completion of their questionnaire, the same researcher assisted to reduce the chance of interviewer bias.
- The researcher followed the same interviewing technique when assisting patients with completion of the questionnaires.
- The questionnaire used obtained only the necessary information to reach the purpose of the research.
- Closed questions with a set of fixed responses were used in the body of the questionnaire to avoid uncertainty and minimise interpretation.
- Questions were kept short and simple so that the meaning of each question was clear and to prevent any misinterpretation of the question by the patient.

3.7 Ethical considerations

Ethical clearance was obtained from the University of KwaZulu-Natal's Ethical Committee, Protocol reference number HSS/0749/012M, for both the pilot study and the research study included as Appendix C, p115. Written permission was obtained from the Hospital Managers of the healthcare facilities where the pilot study and the research study took place included as Appendix D, p116-117 and Appendix E, p118-119 respectively.

Informed consent to participate in the research study was obtained from every patient before the questionnaire was administered. Participation was voluntary and the questionnaire was completed anonymously. A copy of the informed consent form is included as Appendix F, p120-121.

3.8 Summary

This study was designed to determine whether the implementation of ISO 22000 in the foodservice department of a private hospital would result in an increase in patient satisfaction levels and improve the overall food safety audit results. Four patient surveys were conducted using the same validated questionnaire at approximately three monthly intervals over the period of a year. During this time, the ISO 22000 system of food safety management was implemented into the hospital foodservice department. Four independent food safety audits were conducted in the foodservice department during the same year.

The results of the patient satisfaction surveys and the food safety audits will be presented in the following chapter.

CHAPTER 4: RESULTS

This chapter will present the results after data analysis. Data will describe demographics, the relationship between demographics and patient satisfaction, patient satisfaction with the food and food service, the relationship between patient satisfaction and ISO 22000 and results of the food safety audits that were conducted.

4.1 Demographic characteristics

The demographic characteristics of the sample group included in this study were age, gender, length of hospital stay, if the patient was on a special diet and the type of diet that the patient was receiving.

A total of one hundred and sixty patients participated in the four surveys. One hundred and nineteen patients (74.4%) were female and forty one patients (25.6%) were male. Patients were between the ages of 13 and 89 years with the mean age of 44.8 years and the median age of 42.0 years with a standard deviation of ± 16.8 . Three patients did not provide their age.

The patients were categorised in groups regarding the length of hospital stay: “2 days or fewer”, “3 – 7 days” and “more than 1 week”. The majority of patients were admitted for 3 – 7 days (42.5%, n = 68), followed by 2 days or fewer (36.9%, n = 59) and then more than 1 week (18.1%, n = 29). Four patients did not answer this question.

Three options were provided to determine if the patients had been on a special diet: “yes”, “no” and “I don’t know”. Most patients were not on a special diet 65.6% (n = 105), while patients on a special diet contributed 33.8% (n = 54) of total patients and 0.6% (n = 1) did not know if they were on a special diet.

Table 4.1 shows the patient demographics for the four surveys conducted. In order to simplify the reporting of results for age, patient age was grouped into decades as follows: 13 – 19 years, 20 – 29 years, 30 – 39 years, 40 – 49 years, 50 – 59 years, 60 - 69 years, 70 – 79 years and 80 – 89 years of age.

Table 4.1: Patient demographics for the four surveys conducted

Variable		Survey 1 (n = 46)		Survey 2 (n = 41)		Survey 3 (n = 35)		Survey 4 (n = 38)	
		n	%	n	%	n	%	n	%
Age groups (in years)	13 – 19	2	4.3	2	4.9	2	5.7	1	2.6
	20 – 29	8	17.4	5	12.2	2	5.7	5	13.2
	30 – 39	10	21.7	7	17.1	11	31.4	13	34.2
	40 – 49	12	26.1	7	17.1	4	11.4	8	21.1
	50 – 59	4	8.7	9	22.0	7	20.0	6	15.8
	60 – 69	4	8.7	7	17.1	5	14.3	1	2.6
	70 – 79	4	8.7	2	4.9	2	5.7	1	2.6
	80 – 89	1	2.2	2	2.9	1	2.9	2	5.3
	No age provided	1	2.2	0	0	1	2.9	1	2.6
Gender	Female	38	82.6	28	68.3	26	74.3	27	71.1
	Male	8	17.4	13	31.7	9	25.7	11	28.9
Length of hospital stay	2 days or fewer	14	30.4	18	43.9	11	31.4	16	42.1
	3 - 7 days	20	43.5	21	51.2	15	42.9	12	31.6
	More than 1 week	11	23.9	2	4.9	9	25.7	7	18.4
	No answer provided	1	2.2	0	0	0	0	3	7.9
Special diet	Yes	18	39.1	9	22.0	17	48.6	10	26.3
	No	28	60.9	32	78.0	18	51.4	27	71.1
	I don't know	0	0	0	0	0	0	1	2.6

Patients that indicated they were on a special diet were provided with ten options to indicate what type of special diet they were receiving. Table 4.2 shows the responses to this variable. It should be noted that while 54 patients answered that they were on a special diet, 56 patients selected a special diet, indicating that 2 patients did not answer the question regarding being on a special diet correctly. The most common special diet reported was a diabetic diet (42.9%, n = 24) followed by a soft diet (26.8%, n = 15). Three patients (5.4%) were on a combination of two special diets.

Table 4.2: Type of special diets consumed by patients (n = 56)

Variable	n	%
Type of special diet:		
Soft diet	15	26.8
Light diet	2	3.6
Diabetic diet	24	42.9
High protein diet	1	1.8
Cardiac/Low cholesterol diet	2	3.6
Clear fluid diet	0	0
Full fluid diet	4	7.1
Low protein diet	1	1.8
Allergen free diet	2	3.6
Other diet	2	3.6
Combination of special diets:		
Low cholesterol/diabetic	1	1.8
High protein/diabetic	1	1.8
Soft/diabetic	1	1.8

Forty three patients (26.9%) required assistance from the researcher to complete the questionnaire, whilst one hundred and seventeen (73.1%) were able to complete the questionnaire on their own. Only one patient (0.6%) indicated that they had completed the questionnaire before.

4.2 Patient satisfaction with the food and food service

The body of the questionnaire consisted of four sections with subheadings as follows:

- Section 1: Satisfaction with the temperature of the food.
- Section 2: Satisfaction with hygiene and cleanliness.
- Section 3: Satisfaction with food quality.
- Section 4: Overall satisfaction with the catering service.

It should be noted that, the percentages given for each response excludes those patients that did not answer the question.

4.2.1 Satisfaction with the temperature of the food

Patients were most satisfied with the temperature of the hot beverages (89.9%, n = 133); while the lowest number of “satisfied” responses received for this variable were for the

temperature of hot foods (75.2%, n = 118). Table 4.3 shows the results of satisfaction with the food temperature.

Table 4.3: Satisfaction with the temperature of the food (n = 160)

Variable: Food temperature	Satisfied		Neutral		Dissatisfied		Patients that did not answer the question	
	n	%	n	%	n	%	n	%
How satisfied are you with the temperature of the food with regards to:								
a. Hot foods (porridge, soup, main meals, hot dessert etc.)	118	75.2	28	17.8	11	7.0	3	1.9
b. Cold foods (salads, sandwiches, cold desserts, yoghurt etc.)	129	87.2	16	10.8	3	2.0	12	7.5
c. Hot beverages i.e. tea, coffee, hot chocolate etc.	133	89.9	9	6.1	6	4.0	12	7.5

4.2.2 Satisfaction with the hygiene and cleanliness

Patients were most satisfied with the ward hostess uniform and appearance (95.9%, n = 142); while the lowest number of “satisfied” responses received for this variable were for the appearance of the crockery and cutlery (91.4%, n = 139). Table 4.4 shows the results of satisfaction with hygiene and cleanliness.

Table 4.4: Satisfaction with hygiene and cleanliness (n = 160)

Variable: Hygiene and cleanliness	Satisfied		Neutral		Dissatisfied		Patients that did not answer the question	
	n	%	n	%	n	%	n	%
How satisfied are you with the hygiene and cleanliness of the following:								
a. Appearance of crockery and cutlery (was the crockery chipped or stained?)	139	91.4	8	5.3	5	3.3	8	5.0
b. Meal and beverage trays	149	95.5	7	4.5	0	0	4	2.5
c. Stainless steel plate cover	145	93.5	8	5.2	2	1.3	5	3.1
d. Ward hostess uniform and appearance	142	95.9	6	4.1	0	0	12	7.5

4.2.3 Satisfaction with the food quality

Patients were most satisfied with the freshness of the salads (87.8%, n = 115); while the lowest number of “satisfied” responses received for this variable were for the variety of choices on the menu (70.7%, n = 106). Table 4.5 shows the results of satisfaction with the quality of the food.

Table 4.5: Satisfaction with the quality of the food (n = 160)

Variable: Food quality	Satisfied		Neutral		Dissatisfied		Patients that did not answer the question	
	n	%	n	%	n	%	n	%
How satisfied are you with the food with regards to:								
a. Freshness of fruit	128	87.1	13	8.8	6	4.1	13	8.1
b. Freshness of salads	115	87.8	12	9.2	4	3.0	29	18.1
c. Quality of meat (was meat tough or dry?)	111	76.6	20	13.8	14	9.7	15	9.4
d. Taste of food	118	78.1	20	13.3	13	8.6	9	5.6
e. Presentation and appearance of food	134	87.6	14	9.1	5	3.3	7	4.4
f. Variety of choices on the menu	106	70.7	24	16.0	20	13.3	10	6.3

4.2.4 Satisfaction with the overall catering service

Patients were most satisfied with the layout and presentation of the tray for meals and beverages (89.6%, n = 138); while the lowest number of “satisfied” responses received for this variable were for the provision of meals for food allergies (68.7%, n= 44). Table 4.6 shows the results of overall satisfaction with the catering service.

Table 4.6: Satisfaction with the overall catering service (n = 160)

Variable: Overall food service satisfaction	Satisfied		Neutral		Dissatisfied		Patients that did not answer the question	
	n	%	n	%	n	%	n	%
What is your overall satisfaction level with the catering service with regards to:								
a. Service times of meals and beverages	120	77.9	23	14.9	11	7.2	6	3.8
b. Receiving the items that you ordered	127	82.5	15	9.7	12	7.8	6	3.8
c. Layout and presentation of the tray for meals and beverages	138	89.6	14	9.1	2	1.3	6	3.8
d. Explanation of items on the menu	118	76.6	29	18.8	7	4.6	6	3.8
e. Handling of special food requests (if applicable)	70	82.3	10	11.8	5	5.9	75	46.9
f. Provision of meals for special diets (if applicable)	63	76.8	17	20.7	2	2.5	78	48.8
g. Provision of meals for food allergies (if applicable)	44	68.7	19	29.7	1	1.6	96	60.0
h. Information on menu regarding the presence of allergens in meals	66	69.5	24	25.3	5	5.2	65	40.6
i. Overall, how satisfied are you with the food and food service at this hospital?	127	84.1	14	9.3	10	6.6	9	5.6

The above results have been summarised to give an average percentage for each variable, as presented in Table 4.7. These results show that satisfaction levels were the highest for hygiene and cleanliness (94.1%), followed by food temperature (84.1%) and then food quality (81.3%). Patients were most dissatisfied with the food quality (7.0%).

Table 4.7: Average patient satisfaction with food temperature, hygiene and cleanliness, food quality and the overall catering service

Variable	Satisfied	Neutral	Dissatisfied
	%	%	%
1. Food temperature	84.1	11.6	4.4
2. Hygiene and cleanliness	94.1	4.7	1.1
3. Food quality	81.3	11.7	7.0
4. Overall catering service	78.7	16.6	4.7

In order to further investigate patient satisfaction with the food and food service, two additional questions were asked. The first of these questions was “If you were not at your bed at service times, were you provided with your meal or beverage on your return?” Patients were provided with four responses to choose from as follows:

- Response 1: “Yes, the meal/beverage that was provided was acceptable to me”.
- Response 2: “Yes, however the temperature, quality and presentation of the meal/beverage was unacceptable to me”.
- Response 3: “No”.
- Response 4: “Not applicable”.

Most patients responded 1 (49.4%, n = 79), followed by response 4 (30.6%, n = 49), then response 3 (11.2%, n = 18) and lastly response 2 (8.8%, n = 14). All one hundred and sixty patients answered this question.

The second question was “Has the hospital food and foodservice been as good as you expected?” The patient was asked to respond: “yes”, “no” or “I don’t know”. Most patients answered “yes” (76.5%, n = 117), followed by “no” (16.3%, n = 25) and 7.2% (n = 11) answered “I don’t know”. Seven patients did not answer this question.

At the end of the questionnaire patients were given the opportunity to write a comment. Ninety two patients chose to write a comment (57.5%), whilst sixty eight (42.5%) did not. Table 4.8 shows the qualitative results of this study which were the written comments given.

Comments have been grouped into categories or themes and have been reported as positive, negative or suggestions given. Seven suggestions were given with the following themes:

- Variety available on the menu, for example “The menu should provide enough variety to accommodate all cultures” and “The menu should contain more vegetables and salads and less stodge”.
- Ward hostess attitude and behaviour, for example “Multicultural food servers would promote the good status of the hospital”.
- Beverage service, for example “Please provide your meals with something to drink at the same time” and “Please provide something like cake, muffins or biscuits with afternoon tea”.
- Quality of food provided, for example “The vegetables are tough and should be cooked for longer”.
- Quantity of food provided, for example “Portions at supper should be bigger because it is a long time to wait until breakfast”.

Table 4.8: Comments provided by patients

Category of comment	Positive (n = 40)		Negative (n = 84)		Suggestion (n = 7)	
	n = 40	%	n = 84	%	n = 7	%
Variety available on the menu	1	1.1	11	12.0	2	2.2
Taste of food	1	1.1	10	10.9	0	0
Ward hostess attitude and behaviour	7	7.6	5	5.4	1	1.1
Meal and beverages service times	1	1.1	7	7.6	0	0
Beverage service	0	0	11	12.0	2	2.2
Temperature of food	0	0	2	2.2	0	0
Temperature of beverages	0	0	1	1.1	0	0
Condition of crockery and/or cutlery	0	0	4	4.3	0	0
Presentation of food	1	1.1	0	0	0	0
Receiving of items ordered	0	0	1	1.1	0	0
Quality of food provided	4	4.3	12	13.0	1	1.1
Quantity of food provided	0	0	10	10.9	1	1.1
Special diets	0	0	3	3.3	0	0
Explanation of the menu	0	0	4	4.3	0	0
Overall food and food service	25	27.2	3	3.3	0	0

4.3 The relationship between demographics and the patient satisfaction

This section will report on the results of the relationship between demographics and the patient satisfaction.

The five options that the patients were originally provided to choose from were conflated into three options: “satisfied”, “neutral” and “dissatisfied”. The question asking “Overall, how satisfied are you with the food and foodservice at this hospital?” was used to determine this relationship.

Patients in the age group 40 – 49 years were most satisfied with the overall food and food service (19.2%, n = 29) followed very closely by patients in the 30 – 39 age group (18.5%, n = 28). The age group 13 – 19 years reported the least number of satisfied responses on overall satisfaction with the food and food service (2.6%, n = 4).

Of the patients who gave a satisfied response to the question, 59.6% (n = 90) were female and 24.5% (n = 37) were male.

The most satisfied patients were those that had been in hospital for three to seven days (35.8%, n = 54). Those patients that had been in hospital for more than one week, reported the least number of satisfied responses to this question (16.6%, n = 25).

Of the patients that reported being on a special diet, 79.6% (n = 43) indicated a satisfied response to the question “Overall, how satisfied are you with the food and foodservice at this hospital?”

Table 4.9 shows the relationship between demographics and overall patient satisfaction.

Table 4.9: The relationship between demographics and overall patient satisfaction
(n = 160)

Variable		Satisfied		Neutral		Dissatisfied	
		n	%	n	%	n	%
Age groups (in years)	13 – 19	4	2.6	1	0.7	2	1.3
	20 – 29	17	11.3	2	1.3	1	0.7
	30 – 39	28	18.5	7	4.6	3	2.0
	40 – 49	29	19.2	0	0	0	0
	50 – 59	21	13.9	1	0.7	3	2.0
	60 – 69	15	9.9	0	0	1	0.7
	70 – 79	6	4.0	2	1.3	0	0
	80 – 89	5	3.3	1	0.7	0	0
	No age provided	2	1.3	0	0	0	0
Gender	Female	90	59.6	14	9.3	8	5.3
	Male	37	24.5	0	0	2	1.3
Length of hospital stay	2 days or fewer	46	30.5	6	4.0	4	2.6
	3 – 7 days	54	35.8	7	4.6	5	3.3
	More than 1 week	25	16.6	1	0.7	1	0.7
	No answer provided	2	1.3	0	0	0	0
Special diet	Yes	43	28.5	4	2.6	4	2.6
	No	83	55.0	10	6.6	6	4.0
	I don't know	1	0.7	0	0	0	0

In order to establish any statistically significant relationship between demographics and patient satisfaction with the food and food service, Kruskal-Wallis tests were performed for gender, length of hospital stay and if the patient was on a special diet, against each of the food and food service variables. When conducting these tests, responses were only considered for patients that had entered the demographic information. Table 4.10 shows the results of the Kruskal-Wallis tests for the relationship between gender, length of hospital stay and if the patient was on a special diet against food temperature, hygiene and cleanliness, food quality and the overall catering service.

Table 4.10: Kruskal-Wallis tests for the relationship between gender, length of hospital stay and special diet against the food and food service variables

Demographic characteristic	Food and food service variable	Test statistic value	<i>p</i> value	Comment
Gender	Food temperature	Chi-square = 0.959	0.327	No significant relationship
	Hygiene and cleanliness	Chi-square = 0.460	0.498	No significant relationship
	Food quality	Chi-square = 0.053	0.817	No significant relationship
	Overall catering service	Chi-square = 0.866	0.352	No significant relationship
Length of hospital stay	Food temperature	Chi-square = 0.362	0.834	No significant relationship
	Hygiene and cleanliness	Chi-square = 0.212	0.900	No significant relationship
	Food quality	Chi-square = 0.415	0.813	No significant relationship
	Overall catering service	Chi-square = 2.252	0.324	No significant relationship
Special diet	Food temperature	Chi-square = 0.762	0.383	No significant relationship
	Hygiene and cleanliness	Chi-square = 0.031	0.861	No significant relationship
	Food quality	Chi-square = 0.865	0.362	No significant relationship
	Overall catering service	Chi-square = 0.249	0.618	No significant relationship

Since age is a numerical variable on the ratio scale, the relationship between age and each of the food and food service variables was tested by calculating the Pearson sample correlation coefficient and performing a test for zero correlation. The sample correlation coefficient and test results are shown in Table 4.11.

Table 4.11: Pearson sample correlation coefficient for the relationship between age and the food and food service variables

Demographic characteristic	Food and food service variable	Correlation ²	<i>p</i> value	Comment
Age	Food temperature	$r = -0.093$	0.407	No significant correlation
	Hygiene and cleanliness	$r = -0.132$	0.238	No significant correlation
	Food quality	$r = -0.034$	0.762	No significant correlation
	Overall catering service	$r = -0.144$	0.198	No significant correlation

The results of the statistical tests performed for the demographic characteristics against the food and food service variables showed that there was no significant linear relationship between the patient demographics and their satisfaction with the food and food service.

4.4 The patient satisfaction with the food and food service during the implementation of ISO 22000

One of the objectives of this study was to determine the impact of ISO 22000 on patient satisfaction levels with the food and food service. This was achieved by conducting four surveys approximately three months apart over one year during the course of time within

² r = Pearson sample coefficient of correlation

which the ISO 22000 system was implemented. The first survey, Survey 1, was done before ISO 22000 implementation began and was therefore considered to be the baseline survey. The last survey, Survey 4, was conducted after completion of ISO 22000 implementation. This section will present the results that were obtained from the data analysis of the four surveys as well as the results of the comparison of these surveys over the one year period.

Table 4.12 shows the results of the four surveys conducted. In some cases, the percentages given for a question will not add up to 100% as the percentage of satisfied patients shown excludes the patients that did not answer the question. The number of patients that did not answer each question is shown in Appendix G, p122. The most common response chosen for each question is indicated in bold.

Table 4.12: Results of the four surveys conducted

Variable	Survey 1 (n = 46)						Survey 2 (n= 41)						Survey 3 (n = 35)						Survey 4 (n = 38)					
	Satisfied		Neutral		Dissatisfied		Satisfied		Neutral		Dissatisfied		Satisfied		Neutral		Dissatisfied		Satisfied		Neutral		Dissatisfied	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1. Food temperature																								
a. Hot foods	31	67.4	8	17.4	7	15.2	35	87.5	3	7.5	2	5.0	21	61.8	11	32.4	2	5.9	31	83.8	6	16.2	0	0
b. Cold foods	39	86.7	5	11.1	1	2.2	37	94.9	2	5.1	0	0	24	80.0	5	16.7	1	3.3	29	85.3	4	11.8	1	2.9
c. Hot beverages	36	83.7	5	11.6	2	4.7	38	100	0	0	0	0	29	87.9	1	3.0	3	9.1	30	88.2	3	8.8	1	2.9
2. Hygiene and cleanliness																								
a. Appearance of crockery and cutlery	41	93.2	1	2.3	2	4.5	38	92.7	2	4.9	1	2.4	28	82.4	4	11.8	2	5.9	32	97.0	1	3.0	0	0
b. Meal and beverage trays	43	95.6	2	4.4	0	0	39	95.1	2	4.9	0	0	31	91.2	3	8.8	0	0	36	100	0	0	0	0
c. Stainless steel plate cover	42	95.5	2	4.5	0	0	40	97.6	1	2.4	0	0	30	88.2	3	8.8	1	2.9	33	91.7	2	5.6	1	2.8
d. Ward hostess uniform and appearance	39	97.5	1	2.5	0	0	39	95.1	2	4.9	0	0	31	93.9	2	6.1	0	0	34	97.1	1	2.9	0	0
3. Food quality																								
a. Freshness of fruit	39	86.7	4	8.9	2	4.4	34	97.1	1	2.9	0	0	26	81.3	3	9.4	3	9.4	29	82.9	6	17.1	0	0
b. Freshness of salads	35	89.7	2	5.1	2	5.1	32	97.0	1	3.0	0	0	22	78.6	5	17.9	1	3.6	26	83.9	4	12.9	1	3.2
c. Quality of meat	32	72.7	5	11.4	7	15.9	34	89.5	2	5.3	2	5.3	19	57.6	10	30.3	4	12.1	26	86.7	3	10.0	1	3.3
d. Taste of food	39	84.8	4	8.7	3	6.5	37	92.5	2	5.0	1	2.5	20	60.6	7	21.2	6	18.2	22	68.8	7	21.9	3	9.4
e. Presentation and appearance of food	39	88.6	3	6.8	2	4.5	39	95.1	2	4.95	0	4.9	25	73.5	6	17.6	3	8.8	31	91.2	3	8.8	0	0
f. Variety of choices on the menu	34	75.6	6	13.3	5	11.1	33	84.6	2	1	4	10.3	15	44.1	11	32.4	8	23.5	24	75.0	5	15.6	3	9.4
4. Overall food service																								
a. Service times of meals and beverages	28	65.1	8	18.6	7	16.3	34	85.0	4	10.0	2	5.0	27	79.4	5	14.7	2	5.9	32	86.5	5	13.5	0	0
b. Receiving the items that you ordered	38	84.4	5	11.1	2	4.4	34	87.2	2	5.1	3	7.7	26	76.5	4	11.8	4	11.8	30	83.3	3	8.3	3	8.3
c. Layout and presentation of the tray for meals and beverages	38	86.4	6	13.6	0	0	38	92.7	3	7.3	0	0	28	82.4	4	11.8	2	5.9	35	100	0	0	0	0
d. Explanation of items on the menu	30	66.7	14	31.1	1	2.2	34	82.9	5	12.2	0	0	23	67.6	8	23.5	3	8.8	32	88.9	1	2.8	3	8.3
e. Handling of special food requests (if applicable)	19	70.4	6	22.2	2	7.4	15	83.3	2	11.1	1	5.6	17	94.4	0	0	1	5.6	20	90.9	1	4.5	1	4.5
f. Provision of meals for special diets (if applicable)	19	70.4	7	25.9	1	3.7	12	75.0	4	25.0	0	0	14	77.8	3	16.7	1	5.6	18	85.7	3	14.3	0	0
g. Provision of meals for food allergies (if applicable)	15	71.4	6	28.6	0	0	9	56.3	6	37.5	1	6.25	9	75.0	3	25.0	0	0	11	73.3	4	26.7	0	0
h. Information on menu regarding the presence of allergens in meals	14	56.0	10	40.0	1	4.0	25	80.6	4	12.9	2	6.5	13	61.9	7	33.3	1	4.8	14	77.8	3	16.7	1	5.6
i. Overall, how satisfied are you with the food and food service at this hospital?	37	84.1	3	6.8	4	9.1	36	90.0	3	7.5	1	2.5	24	70.6	6	17.6	4	11.8	30	90.9	2	6.1	1	3.0

It can be seen that “satisfied” was the most commonly chosen response for all questions. These results were collated to determine which had the higher response rate. To simplify the comparison of the “satisfied” results for each question, the response to each variable has been given an overall percentage. The percentage of satisfied patients given excludes the patients that did not answer the question.

- Forty six patients participated in Survey 1. In this survey, patients were most satisfied with hygiene and cleanliness (95.4%), followed by food quality (83.0%) and then food temperature (79.3%). Lastly, the fewest “satisfied” responses received in Survey 1 were for the overall catering service (72.8%).
- Forty one patients participated in Survey 2. In this survey, patients were most satisfied with hygiene and cleanliness (95.1%), followed by food temperature (94.1%) and then food quality (92.6%). Lastly, the fewest “satisfied” responses received in Survey 2 were for the overall catering service (81.4%).
- Thirty five patients participated in Survey 3. In this survey, patients were most satisfied with hygiene and cleanliness (88.9%), followed by food temperature (76.5%) and then overall catering service (76.2%). Lastly, the fewest “satisfied” responses received in Survey 3 were for the food quality (65.9%).
- Thirty eight patients participated in Survey 4. In this survey, patients were most satisfied with hygiene and cleanliness (96.4%), followed by overall catering service (86.4%) and then food temperature (85.8%). Lastly, the fewest “satisfied” responses received in Survey 4 were for the food quality (81.4%).

The purpose and objectives of the research study were to determine patient satisfaction rather than dissatisfaction, therefore the satisfied responses have been further analysed in order to establish whether ISO 22000 implementation resulted in the improvement of patient satisfaction with the food and food service. Table 4.13 shows the results of the satisfied responses given for each question for the four surveys conducted.

Table 4.13: Results of the satisfied responses for the four surveys conducted

Variable	Survey 1 (n = 46)		Survey 2 (n = 41)		Survey 3 (n = 35)		Survey 4 (n = 38)	
	Response = Satisfied		Response = Satisfied		Response = Satisfied		Response = Satisfied	
	n	%	n	%	n	%	n	%
How satisfied are you with the temperature of the food with regards to:								
a. Hot foods (porridge, soup, main meals, hot dessert etc.)	31	67.4	35	87.5	21	61.8	31	83.8
b. Cold foods (salads, sandwiches, cold desserts, yoghurts etc.)	39	86.7	37	94.9	24	80.0	29	85.3
c. Hot beverages i.e. tea, coffee, hot chocolate etc.	36	83.7	38	100	29	87.9	30	88.2
Average percentage response for variable	79.3%		94.1%		76.5%		85.8%	
How satisfied are you with the hygiene and cleanliness of the following:								
a. Appearance of crockery and cutlery (was the crockery chipped or stained?)	41	93.2	38	92.7	28	82.4	32	97.0
b. Meal and beverage trays	43	95.6	39	95.1	31	91.2	36	100.0
c. Stainless steel plate cover	42	95.5	40	97.6	30	88.2	33	91.7
d. Ward hostess uniform and appearance	39	97.5	39	95.1	31	93.9	34	97.1
Average percentage response for variable	95.4%		95.1%		88.9%		96.4%	
How satisfied are you with the food with regards to:								
a. Freshness of fruit	39	86.7	34	97.1	26	81.3	29	82.9
b. Freshness of salads	35	89.7	32	97.0	22	78.6	26	83.9
c. Quality of meat (was meat tough or dry?)	32	72.7	34	89.5	19	57.6	26	86.7
d. Taste of food	39	84.8	37	92.5	20	60.6	22	68.8
e. Presentation and appearance of food	39	88.6	39	95.1	25	73.5	31	91.2
f. Variety of choices on the menu	34	75.6	33	84.6	15	44.1	24	75.0
Average percentage response for variable	83.0%		92.6%		65.9%		81.4%	
What is your overall satisfaction level with the catering service with regards to:								
a. Service times of meals and beverages	28	65.1	34	85.0	27	79.4	32	86.5
b. Receiving the items that you ordered	38	84.4	34	87.2	26	76.5	30	83.3
c. Layout and presentation of the tray for meals and beverages	38	86.4	38	92.7	28	82.4	35	100.0
d. Explanation of items on the menu	30	66.7	34	82.9	23	67.6	32	88.9
e. Handling of special food requests (if applicable)	19	70.4	15	83.3	17	94.4	20	90.9
f. Provision of meals for special diets (if applicable)	19	70.4	12	75.0	14	77.8	18	85.7
g. Provision of meals for food allergies (if applicable)	15	71.4	9	56.3	9	75.0	11	73.3
h. Information on menu regarding the presence of allergens in meals	14	56.0	25	80.6	13	61.9	14	77.8
i. Overall, how satisfied are you with the food and food service at this hospital?	37	84.1	36	90.0	24	70.6	30	90.9
Average percentage response for variable	72.8%		81.4%		76.2%		86.4%	

Table 4.14 shows the results of the percentage of patients satisfied for each variable over the four surveys conducted. The number of patients is not indicated in this table as the number of patients that answered each question is not the same.

Table 4.14: Percentage of most satisfied responses for each variable over the four surveys conducted

Variable	Survey 1 %	Survey 2 %	Survey 3 %	Survey 4 %
Food temperature	79.3	94.1	76.5	85.8
Hygiene & cleanliness	95.4	95.1	88.9	96.4
Food quality	83.0	92.6	65.9	81.4
Overall catering service	72.8	81.4	76.2	86.4

It can be seen that the satisfaction for all variables except food quality improved as a result of the ISO 22000 implementation. In other words, more patients were satisfied after ISO 22000 implementation (Survey 4) compared to the baseline survey which was conducted before ISO 22000 implementation (Survey 1).

Figure 4.1 is a visual representation of the trend of patient satisfaction for each of the variables over the four surveys conducted.

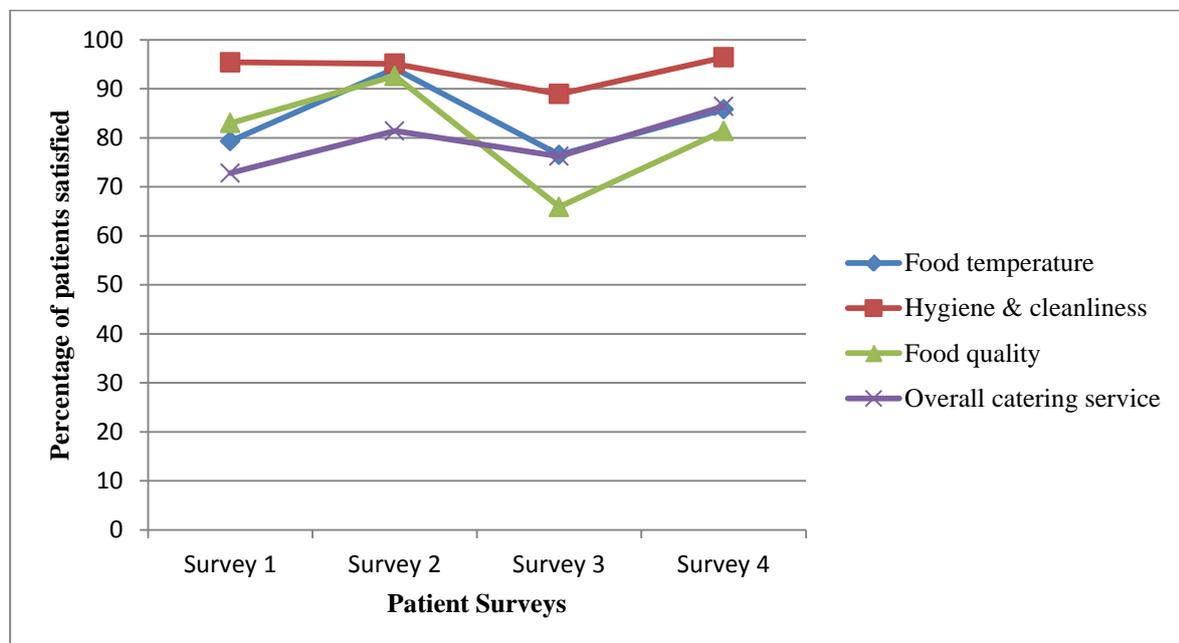


Figure 4.1: Line graph showing percentage of patients satisfied for each variable over the four surveys conducted

In order to establish any statistically significant relationship between the ISO 22000 system and patient satisfaction levels, the results of the satisfaction scores for each variable for Survey 1 were compared with Survey 4. This was to determine if the ISO 22000 system resulted in any significant improvement in patient satisfaction scores from Survey 1 which was conducted before ISO 22000 implementation, compared to Survey 4 which was conducted after the completion of ISO 22000 implementation.

Mann-Whitney tests were performed to compare the satisfaction scores of the food and food service variables of Survey 1 with Survey 4. Results indicated that there was a marginally significant in satisfaction for food temperature and a significant increase in the satisfaction for the overall catering service.

Table 4.15 shows the results of the Mann-Whitney tests performed to compare the satisfaction scores of the food and food service variables of Survey 1 with Survey 4.

Table 4.15: Results of the Mann-Whitney tests to compare the satisfaction scores of the food and food service variables of Survey 1 with Survey 4.

Variable	Test statistic value	<i>p</i> value	Comment
Food temperature	1.357	0.087	Marginally significant
Hygiene & cleanliness	0.645	0.259	No significant difference
Food quality	0.570	0.284	No significant difference
Overall catering service	2.193	0.014	Significant

4.5 Food safety audits

One of the objectives of this study was to determine the impact of ISO 22000 on the results of food safety audits conducted. An independent food safety auditing company was contracted by the hospital management to do a third party food safety audit in the catering department approximately every three months. Four food safety audits were conducted during the time that ISO 22000 was implemented. The first of these was conducted before the implementation of ISO 22000 began and was therefore considered to be the baseline audit; the final audit was conducted after the completion of the ISO 22000 implementation.

The food safety audit results comprise two sections namely the hygiene section and the microbiological section. The hygiene section result was made up of scores for cleaning, food

safety and documentation. The microbiological section result was made up of scores for the microbiological results of surface swabs, hand swabs and food samples tested. All scores were given as percentages.

4.5.1 Food safety audit results during ISO 22000 implementation

Four food safety audits were conducted during the time that ISO 22000 was implemented into the catering department of the private hospital where the study was conducted.

Table 4.16 shows the hygiene results for each audit conducted. Although the results did not improve after every audit, there was a great improvement in the results in Audits 2, 3 and 4 compared to Audit 1 which was the baseline audit.

Table 4.16: Hygiene results for the food safety audits conducted

Audit	Cleaning %	Food safety %	Documentation %	Overall hygiene result %
Audit 1	61	76	95	70
Audit 2	82	94	100	86
Audit 3	87	97	95	92
Audit 4	76	95	91	85

Figure 4.2 is a visual representation of the hygiene scores for the four food safety audits conducted.

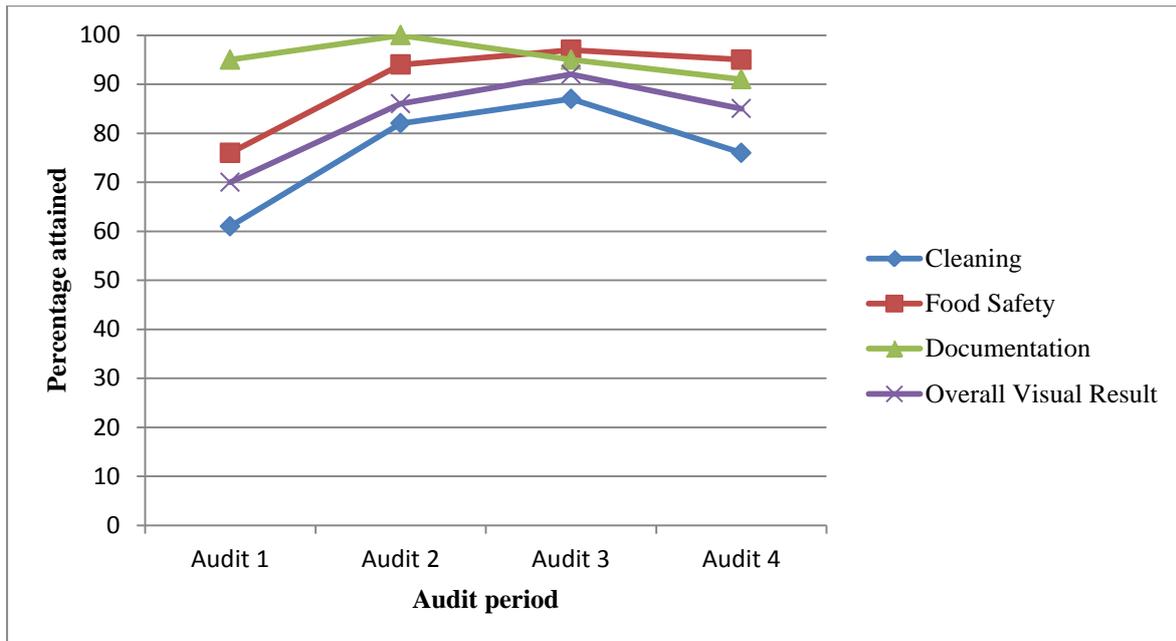


Figure 4.2: Line graph showing the hygiene scores for the four food safety audits conducted during ISO 22000 implementation

Table 4.17 shows the scores of the microbiological results for each audit conducted.

Table 4.17: Scores of microbiological results for the food safety audits conducted

Audit	Surface swabs %	Hand swabs %	Food samples %	Overall micro score %
Audit 1	57	83	86	53
Audit 2	98	100	100	98
Audit 3	90	100	100	93
Audit 4	98	100	100	98

All of the scores of the microbiological results improved over the period of ISO 22000 implementation, in other words the results showed improved scores after ISO 22000 implementation (Audit 4) as compared to the baseline audit (Audit 1).

Figure 4.3 is a visual representation of the microbiological scores for the four food safety audits conducted.

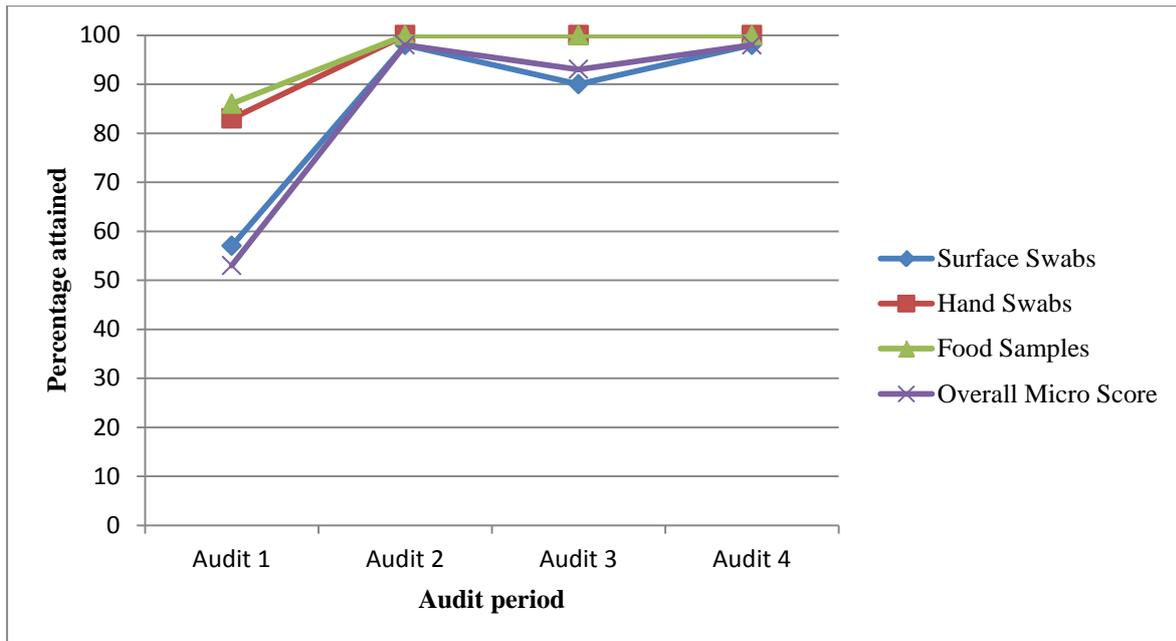


Figure 4.3: Line graph showing the microbiological scores for the four food safety audits conducted during ISO 22000 implementation

4.6 Summary

The results of the patient questionnaire were used to determine the demographics of the sample group and the relationship between the demographics and patient satisfaction with the food and food service by performing Kruskal-Wallis and Pearson sample correlation coefficient tests.

One hundred and sixty patients aged between 13 and 89 participated in the study, the mean age of the patients was 44.8 years. Seventy four percent of the patients were female and twenty six percent were male and most of the patients had been in hospital for between three and seven days. Most of the patients were consuming the normal diet.

There were no statistically significant relationships found between patient demographics and satisfaction with the food and food service.

The body of the patient questionnaire consisted of four sections. For food temperature, patients were most satisfied with the temperature of the hot beverages. For the section on hygiene and cleanliness, patients were most satisfied with the ward hostess uniform and appearance and the cleanliness of the meal and beverage trays. For the section on food

quality, patients were most satisfied with the freshness of the salads followed very closely by the presentation and appearance of the food and the freshness of fruit. For the section on overall catering service, patients were most satisfied with the layout and presentation of the meal and beverage trays.

When comparing the patient satisfaction results before ISO 22000 implementation with the results after ISO 22000 implementation, a statistically significant increase in satisfaction was found for the overall catering service. A marginally significant increase in satisfaction was found for food temperature.

When determining whether ISO 22000 had a positive impact on the results of food safety audits conducted, the results of an audit conducted before ISO 22000 implementation were compared with the results of an audit conducted after ISO 22000 implementation. It was found that both the overall hygiene score and the overall microbiological score had improved.

These results will be discussed in the following chapter and compared to the findings of other researchers.

CHAPTER 5: DISCUSSION

The purpose of this study was to determine the impact of an ISO 22000 system on patient satisfaction and food safety audit results in a private hospital facility. The objectives of this study were:

- To describe the demographics of hospital patients in terms of age, gender, length of hospital stay and type of diet.
- To determine the patient satisfaction with the food and foodservice with regards to food temperature, hygiene and cleanliness, food quality and overall catering service.
- To determine the relationship between the patients' demographics and their satisfaction with the food and food service.
- To determine the impact of ISO 22000 implementation on patient satisfaction with the food and food service, and finally
- To determine the impact of ISO 22000 implementation on the results of food safety audits conducted.

This chapter will discuss the results obtained from the analysis of the data with particular reference to these objectives.

5.1 Objective 1: Demographic characteristics of the sample group

The demographic characteristics of the sample group included in this study were age, gender, length of hospital stay and type of diet. One hundred and sixty patients participated in the study. The results showed that the ages of patients ranged from 13 years to 89 years of age with the mean age being 44.8 years and the median age 42 years. The majority of patients were admitted for 3 – 7 days (42.5%, n = 68), followed by 2 days or fewer (36.9%, n = 59) and then more than 1 week (18.1%, n = 29). Most patients were not on a special diet 65.6% (n = 105), while patients on a special diet contributed 33.8% (n = 54) of total patients and 0.6% (n = 1) did not know if they were on a special diet.

In the study conducted by Uyar *et al* (2012), the demographics investigated were age, gender, marital status, educational level and length of hospital stay. A total of 446 patients were surveyed. The demographic results showed that 52 patients were under the age of 18, 73 patients were between the ages of 18 and 30, 149 patients were between the ages of 30 and

50, and 192 patients were over the age of 51. Of the patients interviewed, 275 (59.0%) were female and 191 (41.0%) were male. Most of the patients were married and had an education level of high school or less. Most patients were in hospital for less than seven days which is consistent with the results of the present study.

5.2 Objective 2: Patient satisfaction with the food and food service

This section will discuss the results of the patient satisfaction with the food and foodservice with regards to food temperature, hygiene and cleanliness, food quality and overall catering service.

5.2.1 Patient satisfaction with food temperature

Patients were asked three questions regarding the temperature of the food as follows:

How satisfied are you with the temperature of the food with regards to:

- a. Hot foods (porridge, soup, main meals, hot desserts)
- b. Cold foods (salads, sandwiches, cold desserts, yoghurt)
- c. Hot beverages (tea, coffee, hot chocolate)

Patients were most satisfied with the temperature of the hot beverages (89.9%, n = 133); while the fewest number of “satisfied” responses received for this variable were for the temperature of the hot foods (75.2%, n = 118).

In this study, one hundred and twenty nine (87.2%) patients indicated they were satisfied with the temperature of cold food (salads, sandwiches, cold desserts, yoghurts). In a Canadian study conducted by O’Hara *et al* (1997) patients who were very satisfied that the cold food was cold enough, were the most satisfied overall. The authors concluded that cold food being cold enough may have been of such importance to the patients in their study as this was conducted during the hottest months of the year. In the current study, the surveys were conducted during different seasons of the year. Menus were changed seasonally to take into account the seasonal weather changes throughout the year.

The importance of food temperature in patient satisfaction surveys conducted in the USA, Switzerland and Canada has been discussed by several researchers (Legnani, Leoni, Berveglieri, Mirolo & Alvaro 2004; Stanga *et al* 2003; O’Hara *et al* 1997; Dube *et al* 1994). Sahin *et al* (2006) and Wright *et al* (2006) reported the temperature of hot foods as a patient priority with regards to foodservice satisfaction in Turkey and Australia respectively. In

agreement with this, are the results of a study conducted in 2007 by Hartwell *et al* who reported that food temperatures (and texture) were the most important attributes that measure patient satisfaction with food in the UK.

5.2.2 Patient satisfaction with hygiene and cleanliness

Patients were asked four questions regarding hygiene and cleanliness as follows:

How satisfied are you with the hygiene and cleanliness of the following:

- a. Appearance of crockery and cutlery (was the crockery and cutlery chipped or stained?)
- b. Meal and beverage trays
- c. Stainless steel plate cover
- d. Ward hostess uniform and appearance

Satisfaction levels with this variable were very high with satisfaction levels for all questions being above 90%. Patients were most satisfied with the ward hostess uniform and appearance (95.9%, n = 142), followed by the cleanliness of the meal and beverage trays (95.5%, n = 149), stainless steel plate cover (93.5%, n = 145) and the appearance of the crockery and cutlery (91.4%, n = 139).

Very little data exists on the impact of hygiene and cleanliness on patient satisfaction with hospital food and foodservice. In an Australian study to demonstrate how the Acute Care Hospital Foodservice Patient Satisfaction Questionnaire (ACHFPSQ) can be used to identify areas for quality improvement in hospital foodservice departments, Fallon *et al* (2007), reported that catering staff issues (including whether staff were neat and clean) and the physical environment (including the condition of crockery and cutlery) consistently rate higher in satisfaction surveys than the food quality. These researchers reported catering staff issues as the most positive dimension of satisfaction. In a survey done by Stanga *et al* (2003) in Switzerland to obtain patients opinions of hospital food in order to improve menu planning and food delivery, only 16% of patients indicated the condition of crockery to be important to them (Stanga *et al* 2003). In the current study, there were no dissatisfied responses given for the ward hostess uniform and appearance and the hygiene and cleanliness of meal and beverage trays.

5.2.3 Patient satisfaction with food quality

Patients were asked six questions regarding food quality as follows:

How satisfied are you with the food with regards to:

- a. Freshness of fruit
- b. Freshness of salads
- c. Quality of meat (was meat tough or dry?)
- d. Taste of food
- e. Presentation and appearance of food
- f. Variety of choices on the menu

In this section, patients were most satisfied with the freshness of the salads (87.8%, n = 115) followed very closely by the presentation and appearance of the food (87.6%, n = 134) and the freshness of the fruit (87.1%, n = 128). The fewest number of “satisfied” responses received for this variable was for the variety of choices on the menu (70.7%, n = 106). The results of the patient satisfaction with the food quality will be covered in depth in the following subsections.

5.2.3.1 Patient satisfaction with the freshness of the salads and the fruit

With regards to the freshness of salads and fruit, 18.1% (n = 29) and 8.1% (n = 13) of patients respectively did not answer these two questions and it is presumed that this is because they either did not eat fruit or salads or had not ordered either of these items.

In a study conducted by DeLuco and Cremer in 1990 in Canada, freshness of food (including fruit and salads) was considered very or moderately important to 98.7% of patients surveyed (DeLuco & Cremer 1990). Kennewell and Kokkinakis (2001) conducted a survey on patient food preferences in an Australian hospital and found that nine of the fifteen most popular food items were fresh fruit, and fresh fruit salad was the most popular dessert. It was found however that fresh fruit and salads were significantly more popular with female patients than male patients. Nevertheless, these researchers suggest that the inclusion of fresh fruit and salads on the menu may be an important factor in patient satisfaction with hospital food (Kennewell & Kokkinakis 2001). Canadian patients perceive the menu to be healthier if the menu includes fresh fruit and salads (Watters *et al* 2003). In the current study, 91.6% (n = 109) of females answered the question on freshness of fruit and 82.4% (n = 21) answered the question on freshness of salads; 92.7% (n = 38) males answered the question on freshness of

fruit and 80.5% (n = 33) answered the question on freshness of salads. It would therefore appear that in the current study, fresh fruit and salads were as popular with males as they were with females.

5.2.3.2 Patient satisfaction with the quality of the meat

With particular reference to toughness or dryness of the meat that was served, 76.6% (n = 111) of patients were satisfied with the quality of the meat. Patients that did not answer this question comprised 9.4% (n = 15) of the total patients surveyed. The most likely reason for this is that these patients were vegetarians.

In an Australian study conducted by Fallon *et al* (2008) the score for the statement “The meat is tough and dry” was the least positively rated score in the food quality category. In the current study, the quality of the meat was second least positively rated; variety of choices on the menu was least positively rated. Fallon *et al* (2008) initiated improvements to address the concerns regarding cooked meat including modification to cooking methods of meat and specifying the quality of meat received from suppliers. These initiatives resulted in a decrease in written comments regarding the meat being tough and dry (Fallon *et al* 2008).

The importance of various quality characteristics of food was investigated in 1990 by DeLuco and Cremer who reported that tenderness of food (including meat) was ranked as very or moderately important by 95.5% of patients in a Canadian hospital (DeLuco & Cremer 1990). It has been reported that red meat and poultry are significantly more popular with male patients than female patients in Australia (Kennewell & Kokkinakis 2001). In the current study, twelve (10.1%) females did not answer the question on quality of meat and three (7.3%) males did not answer the question on meat. It would therefore appear that meat was more popular with males than females in the current study.

5.2.3.3 Patient satisfaction with the taste of the food

The satisfaction level with the taste of the food in the current study was 78.1% (n = 118). In a study conducted by Sahin *et al* (2006) to determine the satisfaction levels with the food services in a military hospital in Turkey, the most important determinants of overall dissatisfaction were taste and appearance of food (Sahin *et al* 2006). These results are consistent with the results of studies conducted in Canada by O’Hara *et al* (1997) and Australia by Kennewell and Kokkinakis (2001). In agreement with the above researchers,

Wright *et al* (2006) found that the taste of meals was the most important determinant of overall food service satisfaction.

5.2.3.4 Patient satisfaction with the presentation and appearance of the food

In the current study, presentation and appearance of food was given a satisfied rating by 87.6% (n = 134) of patients. These results are similar to those found by O'Hara *et al* (1997) in Canada where 82% of patients reported being satisfied with the presentation of meals. These authors reported that the presentation and appearance of meals was one of three variables considered to be important in providing information about patient satisfaction with food and food services (O'Hara *et al* 1997). This view was supported by Sahin *et al* (2006) in a study conducted in Turkey. Similarly DeLuco and Cremer (1990) reported that 91.9% of Canadian patients that participated in a telephonic marketing survey indicated the appearance of the food as very or moderately important when selecting a hospital for medical care (DeLuco & Cremer 1990).

5.2.3.5 Patient satisfaction the variety of choices on the menu

In the quality of food variable of the questionnaire, the fewest number of "satisfied" responses received was for the variety of choices on the menu. Variety of choices on the menu was given a satisfied rating by 70.7% (n = 106) of patients. Wright *et al* (2006) reported that after the taste of meals, variety (amongst others) was most likely to influence patients' overall satisfaction levels with the food and food service in Australian hospitals (Wright *et al* 2006).

Watters *et al* (2003) investigated Canadian patients' perception of food service through focus groups and meal rounds and reported that variety, selection and choice was a common theme that emerged amongst long-stay patients, but also reported that some patients found too much choice overwhelming (Watters *et al* 2003). However, in a study that was also conducted in Canada by Dube *et al* (1994), most respondents agreed that there should be enough meal choices available on a hospital menu to enable them to select a nutritious and satisfying meal (Dube *et al* 1994).

Food preferences relating to cultural values play a role in patient satisfaction levels with hospital food (Sitzia & Wood 1997). This was reiterated by Young *et al* (2000) who reported that in the USA, race consistently had a statistically significant effect on satisfaction scores with non-white patients reporting lower satisfaction levels than white patients. Therefore, the

different cultures and ethnicity of a hospital population must be considered when planning menus to ensure a wide enough variety of foods are available to cater for different cultures and population groups. This is especially important in South Africa which is a diverse country with many different population groups, cultures and religions. The foodservice department in the hospital where the current study was conducted has been run by the same catering company for over ten years. Although the menus are changed seasonally and are designed to take into the account the different race groups, cultures and religions of the hospital population, changes to the menu over the course of the study could have influenced certain responses. The menu is a six day cycle menu and at each meal, offers a choice of two different meat, poultry or fish dishes as well as a vegetarian option. Cultural preferences are catered for by the inclusion of both Eastern and traditional dishes for example mutton breyani served with dhal, beef stew served with samp and beans, and milk with maas. Accompaniments to the main meal offered are a starter and a choice of a dessert or fresh fruit.

5.2.4 Patient satisfaction with the overall catering service

Patients were asked nine questions regarding the overall catering service as follows:

What is your overall satisfaction level with the catering service with regards to:

- a. Service times of meals and beverages
- b. Receiving the items that you ordered
- c. Layout and presentation of the tray for meals and beverages
- d. Explanation of items on the menu
- e. Handling of special food requests (if applicable)
- f. Provision of meals for special diets (if applicable)
- g. Provision of meals for allergies (if applicable)
- h. Information on menu regarding the presence of allergens in meals
- i. Overall, how satisfied are you with the food and food service at this hospital?

Patients were most satisfied with the layout and presentation of the tray for meals and beverages (89.6%, n = 138) and least satisfied with the provision of meals for food allergies (68.7%, n= 44). The results of the patient satisfaction with the overall catering service will be covered in depth in the following subsections.

5.2.4.1 Patient satisfaction with the service times of meals and beverages

One hundred and twenty patients (77.9%) were satisfied with the service times of meals and beverages. In a Canadian study conducted by Dube *et al* (1994) to determine customer's

perceptions of hospital food and dietary services, 83.4% of patients indicated the prompt delivery of meals as being very or moderately important to a good quality hospital meal (Dube *et al* 1994).

Service times and whether meals are served on time can negatively influence patients' overall satisfaction levels (Watters *et al* 2003). Meals that arrive on time was reported by Johns *et al* (2010) as being very important to elderly patients in the UK who look forward to mealtimes and who become dissatisfied with other areas of the food service when meals are late (Johns *et al* 2010, Watters *et al* 2003).

5.2.4.2 Patient satisfaction with receiving the items they had ordered

One hundred and twenty seven patients (82.5%) were satisfied that they had received the items they had ordered. In a study conducted by Dube *et al* (1994) to determine customer's perceptions of hospital food and dietary services, 84.7% of Canadian patients indicated "no missing food items on tray" as being very or moderately important to a good quality hospital meal (Dube *et al* 1994). Comments regarding receiving what was ordered were frequently made by patients in a study conducted by Tranter *et al* (2009) in the USA. However, it was reported that patients' concerns about this could reflect other issues that should be taken into account such as dietary restrictions, the patient may not remember what he/she ordered or the patient received a different meal from what they had ordered due to having a medical procedure. Items missing from trays, for example a serviette, may also prompt the patient to indicate that they had not received what had been ordered (Tranter *et al* 2009).

5.2.4.3 Patient satisfaction with the layout and presentation of the tray

One hundred and thirty eight patients (89.6%) were satisfied with the layout and presentation of the tray for meals and beverages. For the variable "overall catering service", this question received the most satisfied responses. The importance of the correct tray layout was highlighted as a concern in a study exploring patient satisfaction during focus groups held with both nurses and patients in a Canadian hospital. Nurses reported that the tray layout should enable the bedridden patient to easily reach all items on the tray and 30% of patients were reported as requiring assistance that may depend on the tray set-up (Watters *et al* 2003).

5.2.4.4 Patient satisfaction with the explanation of items on the menu

One hundred and eighteen patients (76.6%) were satisfied with the explanation of items on the menu. Ward hostesses have the responsibility of providing each patient with a menu, answering any questions that patients may have regarding menu items and taking the patients' menu order. As South Africa is a multilingual society, difficulties with language of the patient or the ward hostess, may have had an influence on the patients' response to this question. It is also possible that a patients' response to this question may have been influenced by the attitude and friendliness of the ward hostess. The questionnaire did not include a question on the attitude of the ward hostess.

In a study in the USA conducted by Lau and Gregoire (1998), it was reported that the attention given by food service staff and the explanation of items on the menu was the second highest predictor of overall patient satisfaction with the food. When patient expectations relating to courtesy of food service staff were met or exceeded, satisfaction ratings increased (Lau & Gregoire 1998). This is consistent with the findings of researchers in Iran, Australia and Canada who have found that food service staff characteristics such as friendliness, helpfulness, attentiveness, menu knowledge and overall interaction with the patient have a significant impact on patient food service satisfaction (Jessri *et al* 2011; Watters *et al* 2006; Wright *et al* 2006; Dube *et al* 1994; DeLuco & Cremer 1990).

5.2.4.5 Patient satisfaction with special meal requests, special diets and food allergies

Most patients did not answer the questions related to special meal requests and the provision of special diets and food allergies in this section of the questionnaire. As previously discussed, most patients were not on a special diet. With regards to this section of the questionnaire, patients were most satisfied with the handling of special food requests (82.3%, n = 70); the fewest number of "satisfied" responses received for this section was for the provision of meals for food allergies (68.7%, n = 44). There is no data on what the special food requests were as no further information in this regard was requested from the patient. Only one patient commented that they were not aware that special food requests could be made.

Although these results show that 76.8% (n = 63) of patients were satisfied with the provision of meals for special diets, it has been previously reported and discussed that no statistically

significant relationship was found between being on a special diet and overall satisfaction with the food and food service.

Forty four patients (68.7%) indicated being satisfied with the provision of meals for food allergies. However in the section of the questionnaire on special diets, only two (3.6%) of patients that were on a special diet indicated being on an allergen free diet. It is presumed that the reason for this was either non-disclosure by the patient regarding a food allergy, or misunderstanding of the question being asked. In some instances, patients may not have mentioned a food allergy (or considered a food allergy to be a special diet) as they were comfortable making their own choices from the menu on offer.

In order to alert patients to the presence of allergens in the food and food service environment, the following statement regarding food allergens is printed on each patient menu: “In an effort to provide you with safe food, please note that this kitchen may have used a product that contains the following allergens; Milk, Eggs, Soy, Wheat, Peanut, Shellfish, Fish, Tree nuts. If you are allergic to one of these or any other ingredients possibly used, please speak to the Catering Manager to arrange a suitable alternative meal. Care will be taken to produce an allergen-free meal although the environment we work in is not allergen free”.

Sixty six (69.5%) patients who responded to this question indicated that they were satisfied with this information. It is presumed that the patients who did not answer this question were not allergic to any foods or did not notice the above statement on the menu and could therefore not provide a response. This question was included in the questionnaire as in the ISO 22000 system, food allergens are considered to be a food safety hazard. The researcher was interested in what percentage of the patient population this food safety hazard is applicable to and whether the food allergen statement is understood by patients when reading the menu.

In the literature reviewed on the relationship between patient satisfaction levels and special diets, no information was found specifically on food allergies.

5.2.4.6 Additional questions asked regarding the overall catering service

In order to further investigate patient satisfaction with the overall catering service, two additional questions were asked. The first of these questions was regarding meals and beverages served when the patient was not in bed during service times. Patients were given four responses to choose for the question “If you were not at your bed at service times, were you provided with your meal or beverage on your return?” as follows:

- Response 1: “Yes, the meal/beverage that was provided was acceptable to me”
- Response 2: “Yes, however the temperature, quality and presentation of the meal/beverage was unacceptable to me”
- Response 3: “No”
- Response 4: “Not applicable”

Most patients chose response 1 (49.4%, n = 79), followed by response 4 (30.6%, n = 49) with a similar number choosing responses 3 and 2 (11.2%, n = 18) and (8.8%, n = 14) respectively.

In the literature reviewed on patient satisfaction levels with hospital food services, no information was found on meals and beverages served when the patient was not in bed during service times. This question was included in the questionnaire on request of the Hospital Manager where the study was conducted as several complaints had been received in the past from patients regarding not receiving meals and beverages because they were not in bed during service times. To address these complaints, training had taken place with the ward hostesses on the procedure to be followed in this situation before the baseline survey was conducted. Therefore the reason for the inclusion of this question was to establish the effectiveness of the training conducted.

The second question was “Has the hospital food and foodservice been as good as you expected?” The patient was asked to respond: “yes”, “no” or “I don’t know”. Most patients answered “yes” (76.5%, n = 117), followed by “no” (16.3%, n = 25) and 7.2% (n = 11) answered “I don’t know”.

The patients’ expectation of the hospital food and food service may influence their overall satisfaction levels. This was highlighted by Fallon *et al* (2008) who reported that “food does not have to be of a high quality for the patient to be satisfied as satisfaction is a comparison between expectation and a reality or experience” (Capra 1998). Due to institutional

stereotyping, patients may have a low preconceived expectation about hospital food where they perceive that hospital food is prepared with cheap ingredients and will never compare favourably with home-cooked meals (Johns *et al* 2010). Therefore, patients may expect food to be poor quality, and as a result may be inclined to rate “average” food quality well (Capra *et al* 2005). The likelihood of a patient being satisfied with the food, often depends on the expectation of that patient and whether these expectations are met or not (Lau *et al* 1998).

5.3 Objective 3: The relationship between demographics and patient satisfaction with the food and food service

To determine the relationship between demographics and patient satisfaction levels with the food and food service, the question on the questionnaire asking “Overall, how satisfied are you with the food and foodservice at this hospital?” was used.

5.3.1 The relationship between age and patient satisfaction

Patients in the age group 40 – 49 years were most satisfied with the overall food and food service (19.2%, n = 29) followed very closely by patients in the 30 – 39 age group (18.5%, n = 28). The age group 13 – 19 years reported the least number of satisfied responses to this question (2.6%, n = 4).

Several researchers in hospitals in Serbia, the Netherlands, Australia, the USA and Canada have found that age is the most consistent predictor of patient satisfaction with older patients being more satisfied than younger patients (Vukovic’ *et al* 2012; Hekkert *et al* 2009; Wright *et al* 2006; Young *et al* 2000; Belanger & Dube 1996; Dube *et al* 1994). Although the results of this study were in agreement with this, the statistical analysis of the data did not find a significant relationship between age and levels of patient satisfaction. This is consistent with the findings of studies conducted by Fallon *et al* (2008) in Australia and O’Hara *et al* (1997) in Canada as well as those from a study conducted by Tranter *et al* (2009) in the USA who found no differences in food quality ratings based on age.

5.3.2 The relationship between gender and patient satisfaction

Data showed that 74.4% (n= 119) of patients were female and 25.6% (n= 41) of patients were male. The greater number of female patients can mostly be explained by the inclusion of the maternity ward and the gynaecology patients in the medical and surgical wards in the survey. Of the three patients that did not give their age, two were female and one was male.

Analysis of the age and gender of patients showed the majority of female patients were in the age group 30 – 39 years (30.3%, n = 36), followed by the 40 – 49 year age group (18.5%, n = 22) with the least number of female patients being in the age group 80 – 89 years (2.5%, n = 3). It is interesting to note that all of the patients in the youngest age group of 13 – 19 years were female (5.9%, n = 7). For male patients, the age groups 40 – 49 years, 50 – 59 years and 60 – 69 years had an equal number of patients (22.5%, n = 9) in each group. The least number of male patients were in the 20 – 29 year age group (4.9%, n = 2).

Of the patients who gave a satisfied response to the question “Overall, how satisfied are you with the food and foodservice at this hospital?” 59.6% (n = 90) were female and 24.5% (n = 37) were male. Statistical analysis of this demographic variable did not find a significant statistical relationship between gender and the level of patient satisfaction.

Of the one hundred and nineteen female patients in this study, 75.6% (n = 90) gave a satisfied response to the question “Overall, how satisfied are you with the food and foodservice at this hospital?” Males were more satisfied as 90.2% (n = 37) gave a satisfied response to this question. This is in agreement with a study conducted in Canada by Belanger *et al* (1996) who reported more positive responses from men than women.

In general, studies exploring the effect of gender on patient satisfaction levels are inconsistent. In an earlier Canadian study conducted by Dube *et al* (1994), women were found to be more satisfied than men. The findings of studies conducted by Tranter *et al* (2009) in the USA, Fallon *et al* (2008) and Wright *et al* (2006) in Australia and Sitzia & Wood (1997) in the UK found no difference in the satisfaction levels and food quality ratings between genders. Similarly, O’Hara *et al* (1997) found that gender was not related to overall satisfaction with the food and foodservice at a continuing care/rehabilitation hospital in Canada. A study conducted in 2009 in the Netherlands by Hekkert *et al* found that the effects of gender on patient satisfaction were a less important determinant of patient satisfaction than age.

5.3.3 The relationship between length of hospital stay and patient satisfaction

The results of the four surveys conducted showed that 36.9% (n = 59) of patients had been in hospital for two days or fewer, 42.5% (n = 68) had been in hospital for three to seven days and 18.1% (n = 29) had been in hospital for more than one week. The most satisfied patients

were those that had been in hospital for three to seven days (35.8%, n = 54). Those patients that had been in hospital for more than one week, reported the least number of satisfied responses to this question (16.6%, n = 25). However the statistical analysis of the data in this study did not find a significant relationship between length of hospital stay and levels of patient satisfaction.

This is consistent with the findings of studies conducted in 2008 and 2003 in Australia, in 1997 in the UK and in 1990 in the USA where no difference in satisfaction levels according to length of hospital stay was found (Fallon *et al* 2008; Wright *et al* 2003; Sitzia & Wood 1997; DeLuco & Cremer 1990). Similarly, Belanger *et al* (1996) reported that length of hospital stay did not significantly influence patient satisfaction levels in Canada (Belanger & Dube 1996). In the study conducted by Fallon *et al* (2008) in Australia, long stay patients (greater than 14 days) were offered an alternative menu with additional choices which may explain why there was no significant decrease in satisfaction levels of these patients.

Uyar *et al* (2012) found a negative relationship between length of stay and the satisfaction levels for food and food service in a study conducted in Turkey to determine patient satisfaction levels before and after ISO 22000 implementation (Uyar *et al* 2012). This was the only significant relationship found between demographics and patient satisfaction levels in this study. Patients that had been in hospital for more than seven days were less satisfied with the food and food service than those patients that had been in hospital for seven days or less. Similarly in a Swiss study, Stanga *et al* (2003) reported that lengths of hospital stay that exceeded eight days were significantly correlated with a decreased satisfaction with hospital food. A reason suggested by the researchers for this is that patients with longer stays usually have a lower appetite and may eat less due to the severity of their illness; however this may also be due to “long stay patients” becoming bored with the menu (Stanga *et al* 2003). In the hospital where the current study was conducted, “long stay patients” were not offered an alternative menu and this is an intervention that should be considered to increase satisfaction levels amongst this group of patients.

In contrast to the above, a study in the USA found that patients who had a longer hospital stay were more satisfied than patients with a shorter hospital stay (Tranter *et al* 2009). The researchers suggest this may have been because patients who stayed in hospital longer may

have had more time and opportunity to interact with catering staff and were therefore better able to select or request food that was more satisfying to them.

5.3.4 The relationship between type of diet and patient satisfaction

Just under two thirds of the patients interviewed in this study were not on a special diet (65.6%, n = 105), while fifty four (33.8%) patients were. Of the patients that reported being on a special diet, 79.6% (n = 43) indicated a satisfied response to the question “Overall, how satisfied are you with the food and foodservice at this hospital?” However, the statistical analysis of the data in this study did not find a significant relationship between being on a special diet and levels of patient satisfaction. In other words being on a special diet did not have a significant impact on the patients’ satisfaction with the food and food service. This is in agreement with studies done by Fallon *et al* (2008) and Capra *et al* (2005) in Australia; and Lau and Gregoire (1998) and DeLuco and Cremer (1990) in the USA who reported no significant difference in overall patient satisfaction based on receiving a standard diet or special diet.

Many special or therapeutic diets require modifications to the texture, taste, appearance and presentation of the food. Several studies conducted in Iran, the UK, Turkey, Switzerland and Canada have shown these organoleptic factors of food to be statistically significant and important determinants of patient satisfaction levels (Jessri *et al* 2011; Hartwell *et al* 2007; Sahin *et al* 2006; Stanga *et al* 2003; Dube *et al* 1994). O’Hara *et al* (1997) in a Canadian study, reported that being on a special diet can greatly influence a patients’ satisfaction level with the food and when attention is given to texture-modified diets to make them appealing, these diets do not negatively affect satisfaction levels (O’Hara *et al* 1997). Despite the current study not showing a significant relationship between type of diet and patient satisfaction levels, consideration should be given to the texture, taste, appearance and presentation of the food being provided to patients on a special diet.

5.4 Comments provided by patients

At the end of the questionnaire, patients were given the opportunity to write a comment. Most patients wrote a comment 57.5% (n = 92), whilst 42.5% (n = 68) did not. Of the comments written, 91.3% (n = 84) comments were negative, 43.5% (n = 40) comments were positive, whilst 7.6% (n = 7) of the comments were suggestions for improvement, for example “Please provide something like cake, muffins or biscuits with afternoon tea”. Some patients

gave both a positive and a negative comment pertaining to different aspects of the food or service, for example they commented that the “Variety of salads and vegetables is poor” however also indicated that “Ward hostesses were friendly, helpful and prompt.”

Comments were analysed and grouped into categories based on common themes which related to the questions asked in the questionnaire. Most negative comments were for the quality of the food followed by variety available on the menu and beverage service. Most positive comments were for overall food and food service. Suggestions given were for the categories “variety available on the menu”, “beverage service”, “ward hostess attitude”, “quality of food” and “quantity of food provided”.

Tranter *et al* (2009) conducted a study in the USA to identify themes in patient-written comments about meals served in hospital. It was found that temperature of hot food items was the most frequent issue mentioned in patient-written comments and that comments regarding the temperature of hot foods were more frequently mentioned than comments regarding the temperature of cold foods (Tranter *et al* 2009). In the current study, only two patients gave a comment about the temperature of hot food and one patient gave a comment about the temperature of hot beverages. No comments were received regarding the temperature of cold foods. In addition to comments regarding the temperature of hot foods, Fallon *et al* (2009) reported comments regarding choice and variety as frequent comments written. In the current study comments regarding variety available on the menu were the third most frequent comment written.

In a study conducted by Fallon *et al* (2008) to monitor trends in hospital foodservice satisfaction in Australia, 60% of negative comments related to the food quality, 19% to staff issues and 14% to meal service quality. Of the positive comments, 46% related to staff issues and 44% to food quality. In the current study, 14.3% of negative comments related to the food quality, 6.0% to staff issues and 3.6% to overall food and food service. Of the positive comments, 17.5% related to staff issues, 10.0% to food quality and 62.5% to overall food and food service.

Johns *et al* (2010) invited patients in a UK hospital to comment on the good and bad aspects of eating in a hospital. The themes most mentioned were food quality, food choice and service staff with only service staff having a high ratio of positive to negative comments. In the current study, the theme most mentioned was regarding the overall food and food service,

followed by the quality of food and then variety available on the menu. Only overall food and food service had a high ratio of positive to negative comments.

Stanga *et al* (2003) suggested that dissatisfied patients are more vocal than satisfied patients and that dissatisfied patients often make helpful suggestions concerning improvements. In the current study, seven of the written comments were regarding suggestions for improvement.

5.5 Objective 4: The relationship between patient satisfaction and ISO 22000

In order to establish any statistically significant relationship between the ISO 22000 system and patient satisfaction, the results of the satisfaction scores for each variable for Survey 1 was compared to those of Survey 4. In other words, did the ISO 22000 system result in any significant improvement in patient satisfaction scores from Survey 1 which was the baseline survey, as compared to Survey 4 which was conducted after the completion of ISO 22000 implementation.

As the ISO 22000 system integrates all HACCP principles, basic good hygiene practices and prerequisite programmes for food safety as well as focuses on quality and customer satisfaction, it was expected that the implementation of ISO 22000 into the catering department would lead to an increase in patient satisfaction levels.

A statistically significant increase in patient satisfaction was found for the overall catering service and a marginally significant increase in patient satisfaction was found for food temperature.

During a review of the related literature, only one study could be found which investigated patient satisfaction levels before and after ISO 22000 implementation. Uyar *et al* (2012) conducted a study in the food service department of a University Hospital in Turkey to determine the differences in patient satisfaction levels after ISO 22000 implementation and certification. Patients were asked to complete a questionnaire consisting of three sections. The first section gathered information on the patient demographics, whilst the second and third sections gathered information on the patients' satisfaction with the service and the food respectively.

When comparing the results of the current study to that of Uyar *et al* (2012), only the food temperature showed a marginally statistically significant increase in satisfaction levels in both studies. Uyar *et al* (2012) found a statistically significant increase in patient satisfaction levels for appearance of food, taste of food, freshness of salads, freshness of fruit, amount of food, variety of food and service of food. In the study by Uyar *et al* (2012), there was no significant improvement found in the attitude and behaviours of serving staff. It is important to note that unlike Uyar *et al* (2012), the ISO 22000 system in this study did not undergo a certification audit by an external food safety auditing and certification body after implementation. The hospital where this study took place is undergoing expansion and renovation which includes the kitchen, therefore the hospital management decided to wait until after the completion of the kitchen renovations before a certification audit takes place.

5.6 Objective 5: The relationship between food safety audit results and ISO 22000

An independent food safety auditing company had been contracted by the hospital management to do a third party food safety audit in the catering department approximately every three months. Four food safety audits were conducted during approximately the same period that the ISO 22000 system was implemented into the catering department of the private hospital facility where this study took place. One of the objectives of this study was to determine the impact of ISO 22000 on the results of food safety audits, in other words did the food safety audit results show an improvement after ISO 22000 implementation as compared to before ISO 22000 implementation. As ISO 22000 is a food safety management system designed primarily to protect the food supply chain and production processes against hazards and contamination, the expected outcome is that the implementation of ISO 22000 would improve the results of food safety audits.

The food safety audits conducted consisted of two sections namely the hygiene section and the microbiological section. The hygiene section was made up of scores for cleaning, food safety, documentation and an overall score. The microbiological section was made up of scores for the microbiological results of surface swabs, hand swabs and food sample testing, and an overall score.

5.6.1 Hygiene results of food safety audits

All of the hygiene scores except the score for documentation improved over the period of ISO 22000 implementation, in other words the results showed improved scores after ISO 22000 implementation (audit 4) as compared to before ISO 22000 implementation (audit 1).

The greatest increase in score was for food safety, the score increased from 76% in audit 1 to 95% in audit 4. The score for cleaning increased from 61% in audit 1 to 76% in audit 4. The score for documentation decreased from 95% in audit 1 to 91% in audit 4. The overall score for the hygiene section increased from 70% in audit 1 to 85% in audit 4.

In the literature reviewed on ISO 22000 in hospital foodservice departments, no information was found on food safety audit results before and after ISO 22000 implementation. Several studies have been done on the effects of HACCP implementation on food safety audits in various sectors of the food industry. Since ISO 22000 incorporates the HACCP principles, the results of these studies were considered when analysing the results of the current study.

In a review of food safety and hygiene training studies in the commercial food industry sector in the UK, Egan, Raats, Grubb, Eves, Lumbers, Dean and Adams (2007) found that food safety hygiene scores were significantly better in food safety audits done in restaurants that had implemented certain elements of HACCP (such as food hygiene training) as compared to those restaurants that had not (Egan, Raats, Grubb, Eves, Lumbers, Dean & Adams 2007). Similarly, Garayoa, Diez-Leturia, Bes-Rastrollo, Garcia-Jalon and Vitas (2014) demonstrated that training sessions on temperature control and cleaning and disinfecting of food contact surfaces improved the food safety audit results for the temperature control of prepared meals and the effectiveness of cleaning and disinfecting in Spain. Studies done in restaurants and various catering businesses in Austria and in mass contract catering establishments in Italy confirmed these results (Pichler, Ziegler, Aldrian & Allerberger 2014; Legnani *et al* 2004).

In terms of a hospital setting, a study conducted in 12 Iranian hospitals found significantly improved food safety audit scores in 7 of the hospitals in the areas of engineering and infrastructure, equipment and facilities, observance of health measures, staff education and food production and distribution after HACCP implementation (Farzianpour *et al* 2014). These researchers concluded that although more work was required to establish HACCP standards, using a HACCP system in the catering department of a hospital results in improved

patient satisfaction, less complaints, prevention of food poisoning episodes and the avoidance of unnecessary costs.

The improved results of the hygiene section of the food safety audit conducted in audit 4 in the current study agree with the findings of the studies discussed above. Training of catering staff in all areas of food safety is essential to the success of a HACCP or ISO 22000 system. The improved scores for food safety and cleaning are an indication of the effectiveness of the training that was conducted during the implementation phase of ISO 22000 in the current study.

5.6.2 Microbiological scores of food safety audits

All of the microbiological scores improved over the period of ISO 22000 implementation, in other words the results showed improved scores after ISO 22000 implementation (audit 4) as compared to before ISO 22000 implementation (audit 1).

The greatest increase in score was for surface swabs, the score increased from 57% in audit 1 to 98% in audit 4. The score for hand swabs increased from 83% in audit 1 to 100% in audit 4 and the score for food samples increased from 86% in audit 1 to 100% in audit 4. The overall score for the microbiological section showed a considerable increase in score from 53% in audit 1 to 98% in audit 4.

In the literature reviewed on ISO 22000 in hospital foodservice departments, no information was found on the microbiological quality of swabs and food samples before and after ISO 2200 implementation. However several studies show similar results to the current study on the microbiological quality of swabs and food samples before and after HACCP implementation.

Studies done by Garayoa *et al* (2014) in Spain; Soares, Garcia-Diez, Esteves, Oliveira and Saraiva (2013) in Portugal; Osimani, Aquilanti, Babini, Tavoletti and Clementi (2011) and Legnani *et al* (2004) in Italy showed improved microbiological results of swabs taken of food contact surfaces, equipment, utensils and food personnel hands after as compared to before HACCP implementation in school and work cafeterias, university canteens and mass catering establishments respectively (Garayoa *et al* 2014; Soares *et al* 2013; Osimani *et al* 2011;

Legnani *et al* 2004). Microbiological analysis of food samples were also significantly improved in the studies conducted by Soares *et al* (2013) and Legnani *et al* (2004).

Soriano, Rico, Molto and Manes (2002) investigated the microbiological quality of restaurant meals in Spain after the introduction of HACCP and reported results that show a decrease in the microorganisms detected in food samples after HACCP implementation. The same result was found in 2011 by Osimani *et al* in a university canteen.

In a dairy plant in Serbia, a significant decrease was found in the microbial count of pasteurised milk after HACCP implementation compared to before HACCP implementation (Nada, Ilija, Igor, Jelena & Ruzica 2012).

Safe drinking water is an important contributor to public health and is equally important in catering establishments where water is used as an ingredient in food preparation as well as for cleaning. HACCP was first adopted by the Icelandic waterworks as a preventative approach for water safety management in 1997. Ten years later, a study to evaluate the effectiveness of HACCP was undertaken and findings revealed that compliance with drinking water quality had improved considerably following the implementation of HACCP (Gunnarsdottir & Gissurarson 2008).

In 1993, Shanaghy *et al* (1993) reported on the improvements of the microbiological quality of food samples from a hospital cook-chill system in Ireland after the implementation of HACCP. The results of this study showed that after HACCP implementation, more than 90% of food samples tested within normal limits for total bacterial count with the virtual elimination of pathogens (Shanaghy *et al* 1993).

While the current study did not take this into consideration, enteral feeds provide a different but interesting concern with regards to food safety within a hospital environment. Enteral feeds are usually administered to patients susceptible to food poisoning and food borne diseases. Oliveira *et al* (2001) reported on the implementation of a HACCP system for the quality assurance of preparation, storage and delivery of enteral feeds to patients in a hospital in the UK. Before HACCP implementation, the results of bacterial analysis of enteral feeds showed counts higher than recommended³. After HACCP implementation there was a

³ Guidelines on microbial levels of hospital foods published by the United States Food and Drug Administration (1995)

significant reduction in bacterial counts of the feed samples collected and tested leading to the conclusion that contamination of enteral feeds can be reduced or eliminated if a system such as HACCP is applied (Oliveira *et al* 2001).

The microbiological results of the current study are in agreement with those of the studies discussed above as the scores for all categories in the microbiological section had increased after the implementation of ISO 22000. After conducting a study in Spain to determine the impact of a HACCP system in university restaurants, Soriano *et al* (2002) concluded that the use of the microbial quality of meals by microbiological analysis is a good indicator of food safety (Soriano, Rico, Moltó & Mañes 2002).

Although the reviewed studies investigated the food safety audit and microbiological results after HACCP implementation, because the ISO 22000 system integrates all HACCP principles it is reasonable to assume that very similar outcomes would have been found after ISO 22000 implementation.

5.7 Summary

The purpose of this study was to determine the impact of an ISO 22000 system on patient satisfaction levels and food safety audit results in a private hospital facility.

The ISO 22000 system is a system that integrates all HACCP principles, basic good hygiene practices and prerequisite programmes for food safety as well as focuses on quality and customer satisfaction. The expected outcome of this study was that the implementation of an ISO 22000 system into the catering department of a private hospital would lead to an increase in both patient satisfaction levels with the food and food service and the results of food safety audits conducted.

The results discussed in this chapter can be summarised as follows:

- No statistically significant relationship was found between patient demographics and the patient satisfaction with the hospital food and food service.
- Overall, patient responses to food temperature, hygiene and cleanliness, food quality and the overall catering service indicated a generally high level of satisfaction.
- The ISO 22000 system did improve certain aspects of patient satisfaction levels with the food and food service. A statistically significant increase in patient satisfaction

was found for the overall catering service and a marginally significant increase in patient satisfaction was found for food temperature.

- The ISO 22000 system did result in the improvement of food safety audits results.

Although the patients indicated a generally high level of satisfaction with the food and food service at the baseline survey, these results remained high throughout the following surveys and in some aspects showed an improvement. The results indicated that the proposed hypothesis could be accepted and that the implementation of an ISO 22000 system did improve both the patient satisfaction levels and the overall food safety audit results.

CHAPTER 6: CONCLUSION

Private healthcare in South Africa is a competitive industry, healthcare organisations are becoming more customer-orientated and patients expect more from their entire hospital experience. Food safety management systems can be a valuable tool in the foodservice department of a hospital and one such system is ISO 22000. ISO 22000 if successful, could potentially increase patient satisfaction levels with the food and foodservice, have a positive impact on the reduction of hospital-induced malnutrition, reduce the risk of food borne infections and improve the results of food safety audits conducted. The purpose of this study was to investigate and determine whether the implementation of ISO 22000 in a private hospital foodservice department would result in an improvement in patient satisfaction with the food and food service as well as an improvement in the food safety audit results.

6.1 Patient demographics

In this study, the patient demographics investigated were age, gender, length of hospital stay and type of special diet. The ages of patients ranged between 13 and 89 years with the mean age being 44.8 years. Most patients were females and most patients had been in hospital for 3 – 7 days. Most patients were not on a special diet and of those that were on a special diet, a diabetic diet was the most common diet reported.

6.2 Patient satisfaction with the food and food service

Overall, patient responses to food temperature, hygiene and cleanliness and food quality indicated a generally high level of satisfaction. However, improvements are necessary with regards to certain aspects of the overall catering service as more patients indicated either a neutral or dissatisfied response to the questions asked in this section compared to the other sections of the questionnaire.

6.3 The relationship between demographics and patient satisfaction

The results of the relationship between patient satisfaction with the hospital food and food service and the demographics investigated, did not show a statistically significant relationship for age, gender, length of hospital stay and whether the patient was on a special diet or not.

6.4 The impact of ISO 22000 on patient satisfaction

In this study, a statistically significant increase in patient satisfaction was found for the overall catering service. A marginally statistically significant increase in patient satisfaction levels was found for food temperature.

6.5 The impact of ISO 22000 on food safety audit results

The overall hygiene scores and the overall microbiological scores of the food safety audit results improved after ISO 22000 implementation indicating that in this study, the ISO 22000 system did result in improved food safety audits results.

6.6 Critique and limitations of the study

Due to time constraints, this study was limited to one private hospital in KwaZulu-Natal, and confined to a period of approximately one year. In reality, there are many challenges in the implementation and long term maintenance of food safety management systems such as ISO 22000 and HACCP. This has been reported in the literature as discussed in Chapter 2. Everyday realities of a catering operation do present situations that limit or hamper the smooth implementation of any system. It was found that the one year time period given for ISO 22000 implementation was not long enough to overcome some of the challenges encountered. Challenges encountered by the contract catering company during the implementation phase of this study included a lack of motivation from management, staff resistance to behaviour change as well as a lack of training resources. These challenges may have contributed to the decrease in satisfaction scores in Survey 3.

These obstacles may to some degree explain why some aspects of the food and food service did not show any statistically significant improvement in patient satisfaction after ISO 22000 implementation. It can therefore be concluded that a longer implementation time period may have shown more improvements in terms of patient satisfaction as this would have given more time to address the challenges encountered.

However, the improved results of the food safety audit after implementation support the expectation that the ISO 22000 system will protect against food safety hazards and contamination and lead to the provision of food that is safe for consumption.

6.7 Recommendations for further research

As discussed, no studies could be found on the ISO 22000 system in hospital catering in South Africa. The findings of this study indicate that there is potential benefit for a catering company or hospital foodservice department to implement a food safety management system such as ISO 22000, or indeed HACCP. South Africa is a diverse country with many different population groups, cultures and religions, all of which may influence an individual's food preferences and satisfaction expectations. It would therefore be worthwhile to further investigate the impact of an ISO 22000 or HACCP system on patient satisfaction and food safety audit results in hospitals in areas of South Africa where different population groups reside using a larger sample size.

It is recommended that future research on patient satisfaction levels with hospital food and food service should be conducted using questionnaires in other official languages besides English, and that the services of a multilingual person are employed to conduct interviews where necessary.

Future research should allow for a longer time period for implementation of a food safety management system to provide more opportunity to overcome the obstacles that most likely will be encountered during this process.

Although overall the patients indicated a generally high level of satisfaction with the food and food service, this study did not investigate the trends in dissatisfaction reported by patients. Further research exploring the negative responses indicated in patient satisfaction surveys could highlight important issues for a contract catering company operating in a hospital, to improve the service being rendered.

6.8 Recommendations for dietetic practice

Foodservice dietitians play a critical role in the food safety management system of a hospital. Dietitians should encourage the adoption of sound nutritional principles during planning of the full ward diet to enable the distinction between the full ward diet and special diets to be less obvious, thereby improving patient satisfaction. Therapeutic or special diets should be planned with patient satisfaction in mind with extra attention being given to ingredient selection, cooking techniques and food presentation.

The foodservice dietitian can assist the clinical team to identify patients at risk of malnutrition by communicating with both patients and ward hostesses or foodservice assistants regarding reasons for patients not eating the food being provided. Highly immune-compromised patients and patients at high risk for food borne infections can be identified and appropriate steps taken to exclude high risk foods from their diet. Food safety works hand-in-hand with the nutritional quality of hospital food to ensure the well-being and recovery of the patient.

While the Position Statement of the ADA mentioned in Chapter 1 reflects international goals, there is a lack of knowledge regarding the use of food safety management systems such as HACCP and ISO 22000 in hospital foodservice departments in South Africa. This indicates the need for research in this area to not only determine the factors preventing HACCP and ISO 22000 implementation in South African hospitals, but also to determine the current situation regarding the use of these systems in hospitals, their benefit to patient satisfaction levels as well as their impact on food safety and infection control audits.

Despite the lack of statistically significant improvements in some areas of patient satisfaction with the food and food service in this study, the improvements that were found in patients' satisfaction levels as well as the overwhelming improvement in food safety audit results indicate very strongly that ISO 22000 does have a positive impact and offers many advantages in a hospital foodservice department. These improvements indicate that the ISO 22000 system is worth the effort, time and money involved in its implementation, and is advantageous to a catering company operating a hospital foodservice department. Although the implementation of a HACCP –based system such as ISO 22000 is lengthy, requires many resources and does incur costs, the advantages of such a system as shown in this study and in the literature reviewed, reach beyond the assurance of safe food into areas of malnutrition prevention, reduction of nosocomial infection risk, improved food quality and improved patient satisfaction.

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APPENDIX A: PATIENT QUESTIONNAIRE

**DIETETICS & HUMAN NUTRITION
SCHOOL OF AGRICULTURAL, EARTH & ENVIRONMENTAL SCIENCES
UNIVERSITY OF KWAZULU-NATAL**

Master of Science (Dietetics) Degree Research Project

PATIENT QUESTIONNAIRE**GENERAL INFORMATION**

Please complete this section on general information about yourself. This information will enable me to determine the level of satisfaction of different groups of patients which will help to identify the areas where improvement in the food service is needed.

All questions are optional; you do not have to answer any question you feel uncomfortable about.

Date: _____ Ward: _____

1. Have you read and signed the informed consent? (please tick the appropriate block)

Yes No

2. Your approximate age: _____

3. Your gender (please tick the appropriate block)

Female Male

4. How long have you been in hospital? (please tick the appropriate block)

2 days or fewer 3 – 7 days More than 1 week

5. Have you been on a special diet whilst in hospital? (please tick the appropriate block)

Yes No I don't know

6. If you answered yes to the question above, please tick the appropriate block below:

Soft diet Cardiac/Low Cholesterol diet

Light diet Clear Fluid diet

Diabetic diet Full Fluid diet

High Protein diet Low Protein diet

Other diet, please specify _____

Allergen free diet, please state which food you are allergic to _____

7. Was assistance required to complete this questionnaire? (please tick the appropriate block)
 Yes No

8. Have you completed this questionnaire before? (please tick the appropriate block)
 Yes No

Please answer the following questions by ticking the appropriate space that best suits your opinion

1. How satisfied are you with the temperature of the food with regards to:	Very satisfied	Satisfied	Neutral	Dissatisfied	Very dissatisfied
a. Hot foods (porridge, soup, main meals, hot desserts etc.)					
b. Cold foods (salads, sandwiches, cold desserts, yoghurts etc.)					
c. Hot beverages i.e. tea, coffee, hot chocolate etc.					
2. How satisfied are you with the hygiene and cleanliness of the following:	Very satisfied	Satisfied	Neutral	Dissatisfied	Very dissatisfied
a. Appearance of crockery and cutlery (was the crockery chipped or stained?)					
b. Meal and beverage trays					
c. Stainless steel plate cover					
d. Ward Hostess uniform and appearance					
3. How satisfied are you with the food with regards to:	Very satisfied	Satisfied	Neutral	Dissatisfied	Very dissatisfied
a. Freshness of fruit					
b. Freshness of salads					
c. Quality of meat (was meat tough or dry?)					
d. Taste of food					
e. Presentation and appearance of food					
f. Variety of choices on the menu					

4. What is your overall satisfaction level with the catering service with regards to:	Very satisfied	Satisfied	Neutral	Dissatisfied	Very dissatisfied
a. Service times of meals and beverages					
b. Receiving the items that you ordered					
c. Layout and presentation of the tray for meals and beverages					
d. Explanation of items on the menu					
e. Handling of special food requests (if applicable)					
f. Provision of meals for special diets (if applicable)					
g. Provision of meals for food allergies (if applicable)					
h. Information on menu regarding the presence of allergens in meals					
i. Overall, how satisfied are you with the food and foodservice at this hospital?					

9. If you were not at your bed at service times, were you provided with your meal or beverage on your return? (please tick the appropriate block)

Yes, the meal/beverage that was provided was acceptable to me

Yes, however the temperature, quality and presentation of the meal/beverage was unacceptable to me

No

Not applicable

10. Has the hospital food and foodservice been as good as you expected? (please tick the appropriate block)

Yes

No

I don't know

Do you have any other comments regarding the hospital food and/or foodservice?

Thank you for taking the time to complete this questionnaire

APPENDIX B: THE CCP DECISION TREE

Q 1

Do control measures exist ?

yes no

Is control at this step necessary for safety ?

no

Not a CCP

Stop

Decision tree to identify CCP's

Modify step, process or product

yes

Q 2

Is the step specifically designed to eliminate or reduce the likely occurrence of a hazard to an acceptable level ?

no

yes

Q 3

Could contamination with identified hazards occur in excess of acceptable levels or could it increase to unacceptable levels ?

yes

no

Not a CCP

Stop

Q 4

Will a subsequent step eliminate identified hazards or reduce likely occurrence to an acceptable level ?

yes

no

Not a CCP

Stop

Critical Control Point



APPENDIX C: ETHICAL CLEARANCE FROM UKZN



17 August 2012

Mrs Rachael Jane Warren 833837171
School of Agriculture, Earth & Environmental Sciences

Dear Mrs Warren

Protocol reference number: HSS/0749/012M

Project title: The implementation of an ISO 22000 System into a Private Hospital Food Service Facility and the resulting Impact on Patients Satisfaction with the Hospital Food and Food Service

EXPEDITED APPROVAL

I wish to inform you that your application has been granted Full Approval through an expedited review process.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. PLEASE NOTE: Research data should be securely stored in the school/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

Professor Steven Collings (Chair)

/pm

cc Supervisor: Dr Nicky Wiles & Mrs Annette Van Onselen
cc Academic leader: Professor D Jaganyi
cc School Admin: Ms Michelle Francis & Ms Sibongile Ntuli

Humanities & Social Sc Research Ethics Committee

Professor S Collings (Chair)

Westville Campus, Govan Mbeki Building

Postal Address: Private Bag X54001, Durban, 4000, South Africa

Telephone: +27 (0)31 260 3587/8350/4557 Facsimile: +27 (0)31 260 4609 Email: ximbap@ukzn.ac.za /
snymanm@ukzn.ac.za / mohunp@ukzn.ac.za

Founding Campuses: ■ Edgewood ■ Howard College ■ Medical School ■ Pietermaritzburg ■ Westville

INSPIRING GREATNESS



APPENDIX D: REQUEST FOR PERMISSION TO CONDUCT THE PILOT STUDY



DIETETICS & HUMAN NUTRITION
SCHOOL OF AGRICULTURAL, EARTH & ENVIRONMENTAL SCIENCES
UNIVERSITY OF KWAZULU-NATAL

TO: Mr. Henk Laskey
Acting Hospital Manager
Mediclinic Pietermaritzburg
90 Payne Street
Pietermaritzburg
KwaZulu-Natal

RE: Request for informed consent to participate in Master of Science research

I am studying towards a Master of Science (Dietetics) degree in the discipline of Dietetics and Human Nutrition at the University of KwaZulu-Natal. The title of my research project is "The Implementation of an ISO 22000 System into a Hospital Catering Facility and the Resulting Impact on Food Safety and Customer Satisfaction".

The aim of my study is to establish whether ISO 22000 improves the safety of the food provided to patients and whether this in turn improves patient satisfaction with the food and therefore the hospital overall. This will be done by means of a patient questionnaire to assess patient satisfaction with the food service. Before commencing with this study, I am required to do a "Pilot Study" to test the patient questionnaire to be used.

I am hereby requesting permission to use Mediclinic Pietermaritzburg for the pilot study. This will involve interviewing the patients in one ward using the attached questionnaire. Should you agree, I will formally request consent from the each patient before commencing with the questionnaire. The information obtained from the patients will be collected on an anonymous, strictly confidential and voluntary basis. You may withdraw the participation of the hospital at any stage of the pilot study. There will not be any negative or undesirable consequences should you choose to do so.

Should you have any queries regarding my research, please feel free to contact me on 0836200901 or rwarren@fedics.co.za.

Yours Sincerely,

Mrs Rachael Warren
MSc (Diet) Student
rwarren@fedics.co.za
0836200901

Dr Nicky Wiles
MSc (Diet) Supervisor
wilesn@ukzn.ac.za
033 260 5430

Mrs Annette Van Onselen
MSc (Diet) Supervisor
vanonselen@ukzn.ac.za
033 260 6154

INFORMED CONSENT FROM THE HOSPITAL MANAGER:

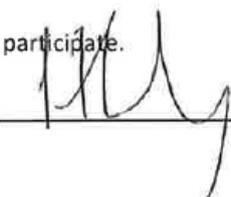
- I hereby confirm that I have been informed by UKZN MSc (Diet) student Rachael Warren about her study "The Implementation of an ISO 22000 System into a Private Hospital Foodservice Facility and the Resulting Impact on Patient Satisfaction with the Hospital Food and Food Service".
- I have also received, read and understood the written information in this letter requesting permission to use Mediclinic Pietermaritzburg in the pilot study.
- I understand that I may contact Mrs Warren (0836200901, rwarren@fedics.co.za) or her supervisors Dr N Wiles (033-2605430, wilesn@ukzn.ac.za) or Mrs Van Onselen (033-2606154, vanonselen@ukzn.ac.za) at any time if I have questions regarding the research.
- I understand Mediclinic Pietermaritzburg's involvement in the study is on a strictly anonymous, confidential and voluntary basis and that consent for any patient participation will be requested from the patient.
- I understand that I may withdraw Mediclinic Pietermaritzburg's participation in the pilot study without any fear of negative or undesirable consequences should I choose to do so.

I hereby consent for Mediclinic Pietermaritzburg to participate.

Name:

Henk Lasky

Signature:



Date:

15 Aug 2012

APPENDIX E: REQUEST FOR PERMISSION TO CONDUCT THE RESEARCH STUDY



DIETETICS & HUMAN NUTRITION
SCHOOL OF AGRICULTURAL, EARTH & ENVIRONMENTAL SCIENCES
UNIVERSITY OF KWAZULU-NATAL

TO: Mr. Richard Mills
Executive Managing Director
Hibiscus Private Hospital
George Street
Port Shepstone
KwaZulu-Natal

RE: Request for informed consent to participate in Master of Science research

I am studying towards a Master of Science (Dietetics) degree in the discipline of Dietetics and Human Nutrition at the University of KwaZulu-Natal. The title of my research project is "The Implementation of an ISO 22000 System into a Hospital Catering Facility and the Resulting Impact on Food Safety and Customer Satisfaction".

The aim of my study is to establish whether ISO 22000 improves the safety of the food provided to patients and whether this in turn improves patient satisfaction with the food and therefore the hospital overall. Patients will be randomly selected to complete a questionnaire to assess their satisfaction with the food service. Questions will relate to food safety and the details of this questionnaire will be sent to you before the study begins. Maternity, surgical and medical wards will be used to select patients. The paediatric ward and ICU/High Care will be excluded. Questionnaires will be conducted once a month, by me, over a period of approximately one year.

I am hereby requesting permission to use Hibiscus Private Hospital in my study. Should you agree to participate, I will formally request consent from the patients. The information obtained from the hospital and patients will be collected on an anonymous, strictly confidential and voluntary basis. You may withdraw the participation of the hospital at any stage of the study. There will not be any negative or undesirable consequences should you choose to do so. At the end of my study, all results will be shared with both you and your management team.

Should you have any queries regarding my research, please feel free to contact me on 0836200901 or rwarren@fedics.co.za.

Yours Sincerely,

Mrs Rachael Warren
MSc (Diet) Student
rwarren@fedics.co.za
0836200901

Dr Nicky Wiles
MSc (Diet) Supervisor
wilesn@ukzn.ac.za
033 260 5430

Mrs Annette Van Onselen
MSc (Diet) Supervisor
vanonselen@ukzn.ac.za
033 260 6154

INFORMED CONSENT FROM THE HOSPITAL MANAGER:

- I hereby confirm that I have been informed by UKZN MSc (Diet) student Rachael Warren about her study "The Implementation of an ISO 22000 System into a Hospital Catering Facility and the Resulting Impact on Food Safety and Customer Satisfaction".
- I have also received, read and understood the written information in this letter requesting permission to use Hibiscus Private Hospital in this study.
- I understand that I may contact Mrs Warren (0836200901), rwarren@fedics.co.za) or her supervisors Dr N Wiles (033-2605430, wilesn@ukzn.ac.za) or Mrs Van Onselen (033-2606154, vanonselen@ukzn.ac.za) at any time if I have questions regarding the research.
- I understand Hibiscus Private Hospital's involvement in the study is on a strictly anonymous, confidential and voluntary basis and that consent for any patient participation will be requested from the patient.
- I understand that I may withdraw Hibiscus Private Hospital's participation in the study without any fear of negative or undesirable consequences should I choose to do so.

I hereby consent for Hibiscus Private Hospital to participate.

Name: R. Mills

Signature:  _____

Date: 11/8/2012

APPENDIX F: INFORMED CONSENT TO PARTICIPATE IN RESEARCH STUDY



DIETETICS & HUMAN NUTRITION
SCHOOL OF AGRICULTURAL, EARTH & ENVIRONMENTAL SCIENCES
UNIVERSITY OF KWAZULU-NATAL

Consent to participate in Master of Science research

I am studying towards a Master of Science (Dietetics) degree in the discipline of Dietetics and Human Nutrition at the University of KwaZulu-Natal. The title of my research project is "The Implementation of an ISO 22000 System into a Private Hospital Food Service Facility and the Resulting Impact on Patient Satisfaction with the Hospital Food and Food Service". The aim of my study is to establish whether ISO 22000 improves the safety of the food provided to hospitalised patients and whether this in turn improves patient satisfaction with the food and therefore the hospital overall.

I hereby request your consent to participate in this study by answering a short questionnaire. You may decline this request and there will not be any negative or undesirable consequences should you choose to do so. Your participation is voluntary; the questionnaire is anonymous and will be kept strictly confidential

Yours Sincerely,

Mrs Rachael Warren
MSc (Diet) Student
rwarren@fedics.co.za
0836200901

Dr Nicky Wiles
MSc (Diet) Supervisor
wilesn@ukzn.ac.za
033 260 5430

Mrs Annette Van Onselen
MSc (Diet) Supervisor
vanonselen@ukzn.ac.za
033 260 6154

INFORMED CONSENT FROM HOSPITAL PATIENT:

- I hereby confirm that I have been informed by UKZN MSc (Diet) student Rachael Warren about her study "The Implementation of an ISO 22000 System into a Private Hospital Food Service Facility and the Resulting Impact on Patient Satisfaction with the Hospital Food and Food Service".
- I have also received, read and understood the written information in this letter regarding the completion of the questionnaire.
- I understand that the completion of the questionnaire is on a strictly anonymous, confidential and voluntary basis.
- I understand that I may decline to answer the questionnaire without any fear of negative or undesirable consequences.
- I understand that I may contact Mrs Warren or her supervisors if I have questions regarding the study and questionnaire that I have answered.

I hereby consent to participate in this study by answering the patient questionnaire.

Name: _____

Signature: _____

Date: _____

APPENDIX G: NUMBER OF PATIENTS THAT DID NOT ANSWER EACH QUESTION

Variable	Survey 1		Survey 2		Survey 3		Survey 4	
	n Total = 46	%	n Total = 41	%	n Total = 35	%	n Total = 38	%
How satisfied are you with the temperature of the food with regards to:								
a. Hot foods (porridge, soup, main meals, hot dessert etc.)	0	0	1	2.4	1	2.9	1	2.6
b. Cold foods (salads, sandwiches, cold desserts, yoghurts etc.)	1	2.2	2	4.9	5	14.3	4	10.5
c. Hot beverages i.e. tea, coffee, hot chocolate etc.	3	6.5	3	7.3	2	5.7	4	10.5
Overall percentage for variable	2.9%		4.9%		7.6%		7.9%	
How satisfied are you with the hygiene and cleanliness of the following:								
a. Appearance of crockery and cutlery (was the crockery chipped or stained?)	2	4.3	0	0	1	2.9	5	13.2
b. Meal and beverage trays	1	2.2	0	0	1	2.9	2	5.3
c. Stainless steel plate cover	2	4.3	0	0	1	2.9	2	5.3
d. Ward hostess uniform and appearance	6	13.0	0	0	2	5.7	3	7.9
Overall percentage for variable	6.0%		0		3.6%		7.9%	
How satisfied are you with the food with regards to:								
a. Freshness of fruit	1	2.2	6	14.6	3	8.6	3	7.9
b. Freshness of salads	7	15.2	8	19.5	7	20.0	7	18.4
c. Quality of meat (was meat tough or dry?)	2	4.3	3	7.3	2	5.7	8	21.1
d. Taste of food	0	0	1	2.4	2	5.7	6	15.8
e. Presentation and appearance of food	2	4.3	0	0	1	2.9	4	10.5
f. Variety of choices on the menu	1	2.2	2	4.9	1	2.9	6	15.8
Overall percentage for variable	4.7%		8.1%		7.6%		14.9%	
What is your overall satisfaction level with the catering service with regards to:								
a. Service times of meals and beverages	3	6.5	1	2.4	1	2.9	1	2.6
b. Receiving the items that you ordered	1	2.2	2	4.9	1	2.9	2	5.3
c. Layout and presentation of the tray for meals and beverages	2	4.3	0	0	1	2.9	3	7.9
d. Explanation of items on the menu	1	2.2	2	4.9	1	2.9	2	5.3
e. Handling of special food requests (if applicable)	19	41.3	23	56.1	17	48.6	16	42.1
f. Provision of meals for special diets (if applicable)	19	41.3	25	61.0	17	48.6	17	44.7
g. Provision of meals for food allergies (if applicable)	25	54.3	25	61.0	23	65.7	23	60.5
h. Information on menu regarding the presence of allergens in meals	21	45.7	10	24.4	14	40.0	20	52.6
i. Overall, how satisfied are you with the food and food service at this hospital?	2	4.3	1	2.4	1	2.9	5	13.2
Overall percentage for variable	22.5%		24.1%		24.1%		26%	

