

Food service concepts

A comparison of the effects on patient satisfaction of three different food service concepts

MSc Thesis

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Preface

This report is the result of a seven-month research project, which I have conducted for the master study Management, Economics and Consumer studies with the specialization Facility Management at Wageningen University.

The support of many people during this project has been highly appreciated. Hereby I would like to thank and express my gratitude to my supervisors, who supervised me during the project. I would like to thank dr. H.B. Kok, for his feedback and guidance that helped me to conduct this study. I would also like to thank dr. J.L.F. Hagelaar for his constructive feedback. Furthermore I would like to thank the food managers in the hospitals for their willingness to participate in my research. I am also thankful for the employees and respondents who participated in the interviews and survey.

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Executive summary

Hospitals reorganize food service concepts to meet beneficial effects like patient satisfaction. The Ministry of Health found that 44% of the Dutch hospitals are currently developing or implementing a new food service concept. The aim of this research is to investigate if different food service concepts lead to differences in patient satisfaction. Three different food service concepts of three different hospitals are analysed, and the perceived quality and patient satisfaction of these concepts are measured. Hospital 1 has a pre-plated cook-hold method of food provision for dinner, and uses a buffet trolley car for lunch and breakfast. In hospital 2 patients can choose the food they want from a menu card, from 7 am till 6.15 pm, and the food will be delivered within 45 minutes. In hospital 3 nutrition assistants offer 6 to 7 times a day small meals to patients.

Patient satisfaction information is of importance for food managers to improve the food service concept. The improvement of food service concepts is also relevant to reduce malnutrition. About 25 to 40 per cent of the patients is already malnourished when they come to the hospital. The most common found food service concepts in literature are the plated food service concept, the room service concept, and they bulk-trolley concept. All these concepts consist of different aspects, which are executed in different ways per food service concepts. The main aspects of a food service concept found in literature are: food quality, presentation, choice, service, and autonomy. These main aspects are divided into sub-aspects, and they formed the input to measure the perceived service quality of the food service concept. The patient satisfaction with the food service concept is measured by having patients grading the total food service concept in terms of their level of satisfaction with the total food service experience. The perceived service quality has, according to the literature, an influence on patient satisfaction. This relationship is moderated by variables like age, gender, type of household, education, religion, perceived health status, and the physical environment, as found in literature. However, these variables were not found as moderators in this study, probably due to how they are measured.

The results on the questionnaire show slightly different patient satisfaction scores for the three different food service concepts. Hospital 1 (plated food service) scored an 8,08, hospital 2 (room service concept) scored an 8,32, and hospital 3 (small meals) scored an 8,13 for patient satisfaction with the food service concept. These slightly different scores are not significant different, which means that different food service concepts do not lead to different patient satisfaction scores. However, significant results are found in the perceived service quality of the different sub-aspects of a food service concept. Hospital 2 (room service concept) scored overall higher than hospital 1 (plated food service) and hospital 3 (small meals). Patients also assessed how important they found the main aspects (food quality, presentation, choice, service, and autonomy) in the survey, and all aspects were even important except autonomy. Patients in hospital 2 found autonomy more important than patients in hospital 1 and 3. A factor analysis is conducted to reduce the 23 variables in the questionnaire for analysis purposes, and resulted into seven underlying factors: autonomy, service, service and appearance frontline employees, food quality, menu variation, presentation, and menu choices. Based on a multiple regression, the factor solution could explain for 51,6% of the variance of patient satisfaction with the food service concept. The food service concept factors that have a statistically significant relationship with patient satisfaction are: autonomy, service and appearance frontline employees, food quality, and presentation. These factors appear to be motivators for patients, and directly influence patient satisfaction.

Based on the results recommendations are given for the hospitals to improve the food service concepts. Hospital 1 should focus on the explanation of the food service concept, and the times of food provision. Hospital 2 can improve the food quality by focusing on temperature and taste, and could make ordering for elderly easier by proving completed meal choices instead of separate components. Recommendations for hospital 3 are to improve the explanation about the food service concept by nutrition assistants, and improving the taste of dinner.

Table of contents

Preface	3
Executive summary	4
Table of contents	5
1. Introduction	6
1.1 <i>Background</i>	6
1.2 <i>Conceptual research design</i>	7
2. Theoretical framework	10
2.1 <i>Patient satisfaction</i>	10
2.2 <i>Food service concept and its aspects</i>	11
2.3 <i>Perceived service quality</i>	15
2.4 <i>Types of food service concepts</i>	17
2.5 <i>Moderating variables</i>	20
2.6 <i>Conceptual model</i>	22
3. Research methodology	23
3.1 <i>Construction of questionnaire</i>	23
3.2 <i>Analysis of food service concepts</i>	26
3.3 <i>Sample size and criteria</i>	28
3.4 <i>Data analysis</i>	28
3.5 <i>Reliability, validity, and ethical accountability</i>	28
4. Results	30
4.1 <i>Interviews and observations</i>	30
4.2 <i>Questionnaire</i>	33
5. Conclusion and discussion	41
5.1 <i>Conclusion</i>	41
5.2 <i>Discussion</i>	41
6. Recommendations	45
6.1 <i>Managerial implications</i>	45
6.2 <i>Recommendations for further research</i>	46
References	47
Appendix 1: Questionnaire	52
Appendix 2: Description food service concepts from interviews	59
Appendix 3: Observation forms	63
Appendix 4: SPSS outputs	65

1. Introduction

“Proper food service and nutritional care in hospitals has beneficial effects on the recovery of patients and their quality of life” (Kondrup, 2004). Hospital food is becoming more important besides other medical and supportive services, because the beneficial effects it has for recovery, higher patient expectations and concerns with malnutrition. Currently, hospitals are renewing their food service concepts to meet these beneficial effects. A study of the Ministry of Health (2016) wherein 96% of the Dutch hospitals participated showed that 44% of the hospitals are currently developing or implementing a new food service concept. The hospitals execute the food service concepts in different ways, the interest of this research is in if these different concepts lead to differences in patient satisfaction. In this chapter first an introduction of food service concepts and patient satisfaction is given, thereafter the problem analysis, research objective, and research questions will be explained.

1.1 Background

In this research, all aspects together that are related to the food provision in hospitals are called ‘food service concept’. Different forms of food service concepts have been identified in literature which all lead to differences in outcomes, for example less waste, cost-effectiveness, a higher energy intake, or a higher patient satisfaction (Edwards, Edwards, & Salmon, 2000; Edwards & Hartwell, 2006; Englund, Lassen, & Mikkelsen, 2007; Hartwell, Edwards, & Beavis, 2007; Mahoney, Zulli, and Walton, 2009). Diverse studies are executed to investigate the perceived quality of aspects of food service concepts, and what influences patient satisfaction. These studies found for example that aspects like the food quality, temperature, service and choices have an influence on patient satisfaction (Johns, Hartwell, & Morgan, 2010; Mahoney et al., 2009). In a healing environment it is important to create an environment that allows satisfied patients (Fottler et al., 2000). Patient satisfaction is a measurement that allows hospitals to improve the quality of care for health outcomes, but also for beneficial effects like (cost) efficiency, less complaints, and productivity of the healthcare system (Chow, Mayer, Darzi, & Athanasiou, 2009). Satisfaction with the food service concept is also of importance for these reasons. A common problem in healthcare is malnutrition, especially among elderly patients (Johns et al., 2010). Research found that satisfaction with the food service concept may lead to a higher food intake, and this is of importance to reduce malnutrition (Hartwell, Edwards, & Beavis, 2007; O’Flynn, Peake, Hickson, Foster, & de Frost, 2005). Increasing the food intake can reduce the complication rates, mortality, and length of hospital stay (Freil, Nielsen, Biltz, Gut, Mikkelsen, & Almdal, 2006). Research suggests a relationship between the food service concept and subsequent patient satisfaction and energy intake. For example, it is assumed that a more personalised food service concept may improve the patient satisfaction and nutritional status (Mahoney et al., 2009). Changing the food service system, can lead to a better intake and higher satisfaction (Johns et al., 2010). Freil et al. (2006) investigated that reorganizing a hospital food service can stimulate the nutrition intake of patients. Reorganizing means, according to the researchers, increasing the energy intake, allowing patients to choose their own food, and trainings for the hospital staff.

In this study three hospitals will be used as cases, because of the anonymity of results the hospitals are called hospital 1, 2 and 3. In hospital 1 the patients choose their dinner at 3pm, only a few hours before consumption. Nutrition assistants fill in the choices via a tablet (Anonymous, 2016). A reorganization of the food service concept can also give the patients more flexibility on what to eat and when. Hospital 2 implemented a room service concept where patients can order food they want, between 7am and 6.15pm via a nutrition call centre, and the food will be delivered within 45 minutes. By implementing this room service concept at hospital 2, the patient satisfaction increased and the waste reduced. Unfortunately this concept did not improve the nutritional status of patients compared to the food service before the new concept (Doorduyn, van Gameren, Vasse, & de Roos, 2015). Increasingly, hospitals change from a central production unit to satellite kitchens, and the focus is more and more on ‘experience’ instead of consumption (Ras, Rosenberg, & den Broeken, 2008). Hospital 3 implemented a concept that focuses on nutritional intake and the experience. Patients get six to seven times a day a small meal, and they have per moment the choice between three or four meals. The food looks tasteful

and will be actively offered by nutrition assistants (Anonymous, 2016). All three hospitals have different food service concepts, but the same aspects are recognisable in these concepts, for example: ordering the food, the preparation of food, and service elements. These aspects are an important part in the meal experiences and have an influence on patient satisfaction (Johns, Edwards, & Hartwell, 2013). This research will investigate the differences in patient satisfaction with the three mentioned different food service concepts.

1.2 Conceptual research design

In this paragraph the problem analysis, research objective, research framework and research questions will be discussed. Thereafter definitions of concepts are given, to provide an understanding of terms used in the research, and the research outline is given.

1.2.1 Problem analysis

Hospitals are renewing their food service systems to improve the results, for example to increase the patient satisfaction. A food service concept consists of different aspects, that all have an influence on patient satisfaction. Many studies are executed to investigate which aspects have the biggest impact on patient satisfaction (e.g.: Johns et al., 2010); Mahoney et al., 2009; Dubè, Trudeau, & Bélanger, 1994). Patient satisfaction with hospital food services is of importance because it has a positive relationship with nutrition and food intake, as well as the recovery and health of patients, and consequently it can reduce the complication rates, mortality and length of hospital stay (Freil et al., 2006). The perceived quality of the foodservice has an influence on the patient satisfaction with the hospital stay (Dall'Oglio et al., 2015).

Hospitals in the Netherlands introduced new food service concepts. It is unknown how patients perceive the quality of these particular food service concepts, and if these different food service concepts lead to differences in patient satisfaction scores compared to each other. The practical relevance of this research lies in gaining insights in the advantages of different food service concepts that are useable for food managers in hospitals to improve their food service concept.

1.2.2 Research objective

This research is concerned with the question if different food service concepts in hospitals lead to different patient satisfaction scores. The food service concepts of three hospitals will be analysed in this research. These three hospitals have three different food service concepts. At hospital 1 breakfast and lunch will be offered via a buffet trolley, and patients can order their dinner via the nutrition assistant till 3pm. Hospital 2 has a room service concept where patients can order food they want during daytime. Hospital three has a concept where nutrition assistants offer six to seven times a day nicely presented small meals. The perceived quality and patient satisfaction scores of these three food service concepts will be investigated.

The following objective is formulated for this research:

The objective of this research is to obtain insight in differences in patient satisfaction levels of different food service concepts, by analysing and comparing the results on patient satisfaction of three different food service concepts.

1.2.3 Research framework

To reach the research objective, the following steps as visualized in the research framework (figure 1) will be followed. The steps can be read from left to right, and will be explained below the research framework.

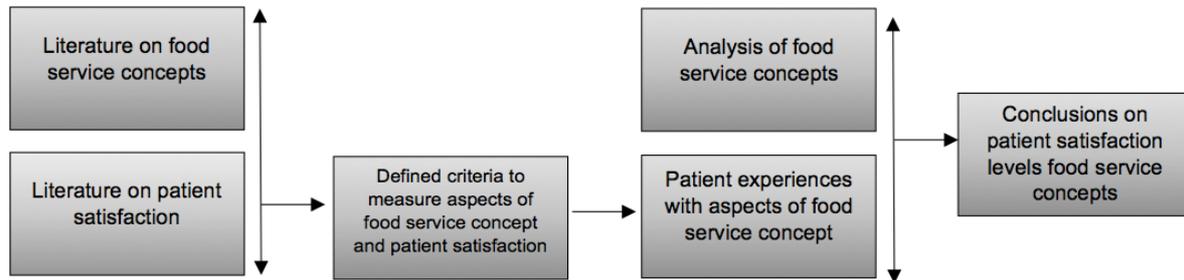


Figure 1: Research framework

The first part of the study contains a literature study about food service concepts and its aspects, and patient satisfaction. The obtained knowledge in the literature study can be used to build a conceptual framework, which can be used to define criteria to measure how patients perceive the different aspects of a food service concept, and to measure patient satisfaction. In the empirical research interviews will be held with experts of the three food service concepts and observations will be done to gain knowledge about the different aspects of the food service concepts in the three hospitals. A questionnaire will be used to measure the perceived quality and patient satisfaction of the three different food service concepts. Finally, in the last phase of the research, the results will be analysed and compared to draw conclusions about differences in patient satisfaction between the different types of food service concepts. The qualitative data will be taken into account in this phase, to explain for differences.

1.2.4 Research questions

The central research question and sub questions are based on the research objective and research framework. The questions serve to gain insights in different food service concepts, and the outcomes of these concepts, in order to achieve the objective.

Central research question

Do, and if so to what extent, different food service concepts in hospitals result in different levels of patient satisfaction, and what explains for these differences?

Sub questions

Sub questions are formulated to answer the central research question.

From literature research:

1. What is a food service concept?
2. What food service concepts have been identified in the literature?
3. What is patient satisfaction and why is patient satisfaction of importance in hospitals?
4. How can patient satisfaction, regarding the aspects of a food service concept, be measured?

From empirical research:

5. How are the three different food service concepts executed based on the aspects of a food service concept?
6. How do patients in different hospitals evaluate the different food service concepts at hand?
7. What explains for these possible differences between patient satisfaction levels with different food service concepts?

1.2.5 Definition of terms

Bulk system: A decentralised approach where patients make their desired food choices in the ward from a bulk trolley (Mahoney et al., 2009)

Nutritional risk: The patient's nutritional status and/or their spontaneous energy intake, combined with the severity of the disease with which they are admitted may increase the morbidity and the length of stay (Freil et al., 2006).

Pre-plated meal service: The collection of menu choices up to 24 hours in advance, and the plating of meals in a central location before service (Mahoney et al., 2009).

Room service system: A patient is required to call the food service department with their meal choice at a time suitable to their appetite, and the meal is delivered within 45 minutes (Mahoney et al., 2009).

Satellite kitchen: Receiving chilled food from central production units (Engelund et al., 2007).

1.2.6 Outline research

The second chapter of this research contains the literature study about food service concepts and patient satisfaction. In the third chapter the research methods are explained. Chapter four contains the results from the empirical study, wherein first an analysis of the food service concepts is made, and secondly the results of the questionnaire are discussed. Chapter five consists of the conclusion of the research, and the discussion. In the final chapter, chapter 6, are recommendations given.

2. Theoretical framework

In this literature study research is done about patient satisfaction, food service concepts and its aspects, perceived service quality, and different types of food service concepts. This theoretical background is needed to analyse the three different food service concepts, and to develop a questionnaire to measure the perceived service quality and patient satisfaction with the different food service concepts. The literature study starts with an investigation of patient satisfaction with food service concepts, and its importance in a hospital setting. The research question 'What is patient satisfaction and why is it of importance in hospitals?' will be answered. Thereafter a study is done about food service concepts and its aspects ('What is a food service concept?'). It is also investigated what perceived service quality is, and how this can be measured for the different aspects of a food service concept. Thereafter three common food service concepts are explained to answer the question 'What food service concepts have been identified in literature?'. It was found that moderators influence the relationship between the perceived service quality with the aspects of a food service concept and patient satisfaction with the food service concept, paragraph 2.5 elaborates on these moderators. Finally, the conceptual model is drawn based on the knowledge found in literature. This conceptual framework is the fundament of the research, and forms the basis for the empirical study.

2.1 Patient satisfaction

This literature study starts with a description of patient satisfaction. The experience of patients with the food service concept can be expressed in a degree of patient satisfaction. First an introduction to the concept is given and thereafter the importance of patient satisfaction is discussed.

2.1.1 Definition of patient satisfaction

Patient satisfaction can be largely interpreted. Williams (1994) defined satisfaction as 'an evaluation based on the fulfilment of expectations'. Several studies found it questionable if these expectations exist at all, or if they really lead to satisfaction. Therefore some studies show that satisfaction is whether or not the experience was better or worse than expected (Williams, Coyle, & Healy, 1998). Also this definition is criticised, because expectations can be managed. If managers attempt to lower expectations to make it possible that the service is better than expected, a higher satisfaction will be produced. Managers are then argued to do the wrong things (Spreng & Mackoy, 1996). The Longman Dictionary of Contemporary English (2016) defines satisfaction as 'a feeling of happiness or pleasure because you have achieved something or got what you wanted'. Oliver (1997) defined satisfaction as 'an evaluative, affective, or emotional response'. Lee, Lee, and Yoo (2000) proposed that patients could only be satisfied or dissatisfied with an object or service after they perceived the object or service. Also Jackson, Chamberlin, and Kroenke (2001) suppose that when experiences with services meet expectations, the likelihood to satisfied patients increases. Patient satisfaction with a food service concept is multifactorial and hard to assess, because of the fact that each patient has his or her own expectations. Patient satisfaction is influenced by technical, environmental and interpersonal factors (Hartwell, Edwards, & Beavis, 2007; Capra, Wright, Sardie, Bauer, & Askew, 2005). It is a complex phenomenon, influenced by many factors. 'Satisfaction with a hospitality experience is a sum of total of satisfactions with the individual elements or attributes of all the products and services that make up the experience' (Pizam & Ellis, 1999).

Patient satisfaction is used as a major indicator all over the world to evaluate and improve the quality of healthcare, based on patients' personal evaluations. Jackson, Chamberlin, and Kroenke (2001) found four purposes of patient satisfaction, namely: 'to compare different healthcare programs or systems, to evaluate the quality of care, to identify which aspects of a service need to be changed to improve patient satisfaction, and to assist organizations in identifying patients likely to disenroll'. Patients make 'trade-offs', this means that a weakness in one aspect could be compensated by a strength in another aspect (Hartwell, Edwards, and Symonds, 2006). It is investigated in literature that most of the consumers have a negative attitude towards hospital meals, also called institutional stereotyping. Before patients eat the food, they have already a negative attitude toward the quality and acceptability of the food (Cardello,

Bell & Kramer, 1995). The patient satisfaction with a food service concept can be measured by giving a score for the food service concept on a scale from 1 to 10, as done by Doorduijn et al. (2015).

2.1.2 Importance of patient satisfaction

Patient satisfaction information is of importance to quality assessments for designing and managing healthcare, to meet the fundamental health service expectation, namely cure. Hospitals want to know what patients value in a food service concept, to know where and how service changes can be made. The feedback of patients can be used to improve the service (Tucker, 2002). Patient satisfaction with a food service concept is also of importance to reduce malnutrition. It is assumed that when the meal is appreciated, the nutritional intake increases (Doorduijn et al. 2015). A number of studies have shown that recovery time can be shortened if the nutritional status of patients improves. Increasing the food intake can also lead to a reduction of complication rates and mortality (Freil et al., 2006). However, between 25 and 40 per cent of the patients in hospitals have some degree of under nutrition (Doorduijn et al., 2015; Edwards, Edwards, & Salmon, 2000). Especially elderly patients suffer from malnutrition (Johns et al., 2010). Doorduijn et al. (2015) suggest that reorganizing the food service concept, by for example giving patients more choice and flexibility, is an option to increase the patient satisfaction and food intake. The social marketing theory suggests that service organizations that deliver products that increase the social wellbeing, fulfil better the consumer's needs, and have a greater customer satisfaction and organizational success (Tucker, 2002). This can be translated to patient satisfaction; food service concepts that fulfil the patients' needs, probably lead to a higher patient satisfaction. Hospitals strive also for satisfied patients due to the competition between different hospitals. Hospitals aim for patients that continue in using their healthcare services and maintain the relationship with patients, because the quality perceptions have an influence on measures like earnings, revenue and asset returns (Hekkert, Cihangir, Kleefstra, Van den Berg, & Kool, 2009; Naidu, 2009).

2.1.3 Conclusion patient satisfaction

The literature is unambiguous about the definition of patient satisfaction, it is seen as a complex phenomenon influenced by many factors. It is proposed that patients should first perceive a service before they can be satisfied or dissatisfied with it. Patient satisfaction is used as an indicator to improve healthcare based on patients' evaluations. Having satisfied patients is of importance for hospitals. It is proven that when patients are satisfied with the food service concept, and especially with the food quality, the nutritional intake increases which leads to for example a faster recovery. Due to the competition between hospitals, it is of importance that patients are satisfied with the services provided and continue in using the services of a certain hospital.

2.2 Food service concept and its aspects

In the literature are several different food provision systems identified, and these all consists of different aspects. In this study, all aspects together related to the food provision in hospitals are called 'food service concept'. In this study, a food service concept consists of: food quality, presentation, choice, service, and autonomy. These aspects will also be further analysed. This selection has been made based on the most frequently aspects mentioned in studies about food service concepts related to patient satisfaction. Food quality is mentioned most frequently as one of the predictors for patient satisfaction in literature (Johns et al., 2010; Doorduijn et al., 2015; Capra et al., 2005; Dubé et al., 1994). Some studies include presentation as part of the food quality, but Doorduijn et al. (2015) and Capra et al. (2005) see presentation as a separate aspect that influences patient satisfaction. The presentation of food will be analysed as a separate aspect in this study. Staff and service issues are also often mentioned as a main predictor for patient satisfaction with a food service concept (Johns et al., 2010; Doorduijn et al., 2015; Capra et al., 2005). 'Choice' is mentioned by Johns et al. (2010) and Doorduijn et al. (2015) as an important aspect related to patient satisfaction. Literature suggests that control and customization have an influence on patient satisfaction (Dubé et al., 1994). Doorduijn et al. (2015) mention this aspect 'autonomy', and this term will also be used in this research. In the paragraphs below will be elaborated on the five aspects of a food service concept (food quality, presentation, choice, service, and autonomy) using sub-aspects.

2.2.1 Food quality

Food quality represents a system of product requirements, both material and immaterial, related to the product itself and its context. Quality can be defined in terms of consumer satisfaction, so quality is 'the requirements necessary to satisfy the needs and expectations of the consumer' (Peri, 2005). These requirements are for example: safety requirements, nutritional requirements and sensory requirements. Sensory characteristics are perceived by consumers, and lead therefore for interaction between the consumer and the product (Peri, 2005). These requirements are applicable to a hospital setting, and can be translated in terms of patient satisfaction. The sensory characteristics are most mentioned in various studies about food quality of hospital food. Flavour, texture, temperature and appearance are themes mentioned by patients and nurses regarding food quality (Watters, Sorensen, Fiala, & Wismer, 2004). Some studies found the appearance of food as a separate aspect, not per se related to food quality (Stanga et al., 2003; Doorduyn et al., 2015), and therefore this aspect is taken separately. The other sub-aspects of food quality as mentioned by Watters et al. (2004) will be discussed below.

Temperature

Several studies mentioned 'temperature' as one of the predictors for food quality (Dubé et al., 1994; Edwards & Hartwell, 2006; O'Hara et al. 1997; etc.). This concerns the temperature of hot food (is it hot enough?), and cold food (is it sufficiently chilled?) (O'Hara et al., 2003; Tranter, Gregoire, Fullam, & Lafferty, 2009). An appropriate temperature of food is also of importance to avoid that food-borne pathogens multiply. Time management and a control of temperature are essential to ensure food quality and safety in hospitals (Réglier-Poupet et al., 2005).

Flavour

Flavour is found as another predictor of food quality. Flavour preferences differ per person, due to intrinsic and extrinsic factors. What one person really likes may be disgusting to another (Van den Bosch et al., 2014). Research found that flavour enhancements are beneficial for older patients. Taste and smell losses occur with aging. In hospitals the average age is often quite high, so additional attention to flavour enhancements will lead to nutritional benefits for elderly (Mathey, Siebelink, de Graaf, & Van Staveren, 2001).

Texture

Food texture is 'the sensory and functional manifestation of the structural, mechanical and surface properties of foods, detected through the sense of vision, hearing, touch and kinesthetics' (Szczeniak, 2002). Words that describe the texture of food are: hardness, cohesiveness, and thickness for example. It is an important part of the sensory characteristics of food (Zijlstra, 2010). Texture and flavour, have an effect on the perception and acceptability of food, but it is product dependent. For example, for bread is texture the most important factor determining the acceptance and perceived freshness, but for soup it may be flavour. Textures that are mainly disliked are: soggy, watery, crumbly, slimy and sticky. These textures are mainly caused by the cooking methods (Hartwell, Edwards, & Beavis, 2007).

2.2.2 Presentation

Many people find taste of food the most important factor that has an influence on intake, but the first sensory contact with the food is through the eyes. The physical appearance is a factor that influences the liking of food (Zellner, Lankford, Ambrose, & Locher, 2009). Several visual factors are associated with the appearance of the food, like the colour, variety, portion size, and volume. These factors have an influence on the food acceptance and consumption (Wadhwa & Capaldi-Phillips, 2014). Zellner et al. (2009) found that food what is presented neatly will be liked more than food presented messy. Consumers thought that cooks took more time for the preparation (Zellner, Loss, Zearfoss, and Remolina, 2014). Crockery, cutlery and meal trays are part of the presentation, because this has an effect on patient satisfaction (Wright, Conelly, & Capra, 2006). The sub-aspects mentioned (colour, portion size and volume, crockery and cutlery) will be discussed below. The variety of food will be discussed in the following paragraph about food choice.

Colour

Colour of food has an influence on the perceived taste. Even colours on the packaging, serving dish, the text used to describe the product, and cutlery use can lead to changes in perceived taste (Chylinski, Northey, & Ngo, 2015). People use colours of food to identify food (Zellner, Loss, Zearfoss, & Remolina, 2014).

Portion size and volume

Several studies were conducted on portion size and food intake. For instance, Kerameas, Vartanian, Herman, & Polivy (2015) found that people eat more when larger portions are served than when smaller portions are served. However, Johns et al. (2013) suggest that giving patients smaller and more energy dense portions a few times a day may increase the calorie intake at older patients, who avert large portions of carbohydrate-rich food.

Crockery and cutlery

The presentation of crockery, cutlery and meal trays has an influence on patient satisfaction with hospital food services (Wright et al., 2006). The visual attractiveness, and how food is plated, has an effect on the liking of the flavour (Zellner et al., 2014). Piqueras-Fiszman, Alcaide, Roura, and Spence (2012) suggest that the same food may taste different when it is presented on plates of different shapes and colours. They found that people like the food more when it comes from a white plate rather than a black plate. The shape of the plate did not have an influence on the perception of the food.

2.2.3 Choice

Stanga et al. (2003) found a positive relationship between the menu size and variety and patient satisfaction. Hospitals make a balance in the range of menu for economic reasons, and in covering patients' preferences. A variety of different foods available lead to an increase of the amount of food consumed. This variety refers to within a meal, and across meals (Remick, Polivy, & Pliner, 2009). Meiselman, de Graaf, and Leshner (2000) distinguish three types of variety: within-meal variety, across-meal variety and dietary variety. All three types contribute to the food acceptance.

Within-meal variety

Within-meal variety refers to the variety of components in a meal (Meiselman et al., 2000). In residential homes, food satisfaction increased when elderly were able to choose food from a menu (Abbey, Wright, & Capra, 2015). The average age in hospitals is high, so this theory may also apply to hospitals. The choice in components must be varied to meet the food patterns of patients. More often people are vegetarian or flexitarian, and are aware of the healthiness and sustainability of food. For example by eating fruit and vegetables of the season, and eating less fat, salt and meat (Keucheniuss & Van der Lelij, 2015).

Across-meal variety

Across-meal variety is about the variety across days, so the variety in for example lunches from day to day, or the variety within days, so breakfast, lunch and dinner in the same day (Meiselman et al., 2000). Research found that the menu planning is very important in the aged care sector, where the quality of life is of importance. Being able to choose what you want is seen as a fundamental right (Abbey et al., 2015).

Dietary variety

Dietary variety is concerned about how varied meals are over a longer period, such as months or years (Meiselman et al., 2000). Patients often have negative attitudes towards institutional foods, and one of the causes is a poor food variety (Cardello, Bell, & Kramer, 1996). If human get the same food repeatedly, a decrease of the palatability ratings were noticed (Remick et al., 2009). Dietary variety includes also the variety over a year. Research found that seasonal variations have an influence on the nutrient intakes of humans, especially in the fall the nutrient intake of patients increased (De Castro, 1990). Also the food consumed differs per season, mainly based on supply and demand factors

(Joachim, 1997). Hospitals can respond to this by offering a meal cycle with different meals in a week and over a longer period.

2.2.4 Service

Patient satisfaction and perception can be affected by the attitude of the staff that serves the meals (Edwards, Edwards, & Salmon, 2000). Johns et al. (2010) suggested that the impact of staff on eating experiences is greater than the impact of the food itself. Employee behaviours determine the perception of the customers and their relationship with the service provider during direct interactions (Parasuraman et al., 1985). In health care, patients must provide information about their wellbeing, condition, how they feel and preferences. They have to participate in the service provision process to create value (Gallan, Jarvis, Brown, & Bitner, 2012). Value creation can be defined as 'a process that increases the customer's well-being, such that the user becomes better off in some respect' (Grönroos & Voima, 2013). The interaction between provider and customer could be direct via personnel, or indirect via devices (Grönroos & Voima, 2013). Interaction via personnel is highly variable, and depends on the frontline employee. The attitude and appearance of the service employees plays a role in this (Nickson, Warhurst, & Dutton, 2005).

Appearance

Various studies have found that the appearance of frontline employees influences the perceived service quality. Vilnai-Yavetz and Rafaeli (2011) suggest that the employee appearance is a factor that promotes or discourages customer approach towards service organizations. The degree to which employees present a clean, neat and tidy appearance influences the pleasantness as experienced by customers. This presentation is expressed in how employees present themselves through clothing, ornaments, and other controllable elements of appearance. Often organizations require employees to wear a uniform of the organization (Vilnai-Yavetz & Rafaeli, 2011).

Attitude

The frontline employees, in most food service concepts the nutrition assistants, have a key role in providing food to patients, and therefore explanation about how the food service concept works is essential (Van der Meij & Kruijenga, 2016). Frontline employees may have different ideas about providing a service. Di Mascio (2010) found three interpretations of service provision, namely: giving customers what they ask for efficiently and courteously, a means to accomplishing immediate objectives, and mutually beneficial relationships with customers through problem solving (Di Mascio, 2010). These levels are also applicable on providing food in hospitals by service staff. Service staff can just provide the food to patients, or can make real contact with the patients. Food service staff gives patients the chance to talk with someone who is not directly related to the patient's medical care, which leads to non-medical conversations. Patients find communication with service staff easier, and more like home, allowing them to express emotions and crack jokes (Johns et al., 2010). An objective could be to improve the nutritional intake, and service staff can help to achieve this goal by providing help to patients. Many patients require help with consuming the food or making a food choice. Friends or relatives of the patients could offer this help, or hospital staff. Research found that the amount of food consumed increases when assistance is provided (Edwards, Edwards, & Salmon, 2000). Role of the nutrition assistants is also to encourage patients to eat appropriate food, and if patients do not want to, they have to come forward with creative solutions or tempt the patients to eat something (Van der Meij & Kruijenga, 2016). In service environments, where interaction between the customer and employee is needed, complaints can arise. This is also the case in hospitals, patients may be dissatisfied with the food. For frontline employees it is important to when receiving a complaint, adapt the behaviour to the expectations of the patient. An effective complaint handling is necessary for patient satisfaction (Gruber, Abosag, Reppel, & Szmigin, 2011).

2.2.5 Autonomy

Often hospital food has a negative image. This is related to the less autonomy patients have in a lot of food service concepts due to limited choice, fixed mealtimes, and choosing one day ahead, so the

flexibility of the food service concept (Doorduyn et al., 2015). There is evidence to suggest that older people, who have exposure to controllable or empowering circumstances, have a higher zest of life (Faulkner, 2001). Empowerment is defined by Gibson (1991) as: 'A social process of recognizing, promoting and enhancing people's abilities to meet their own needs, solve their own problems and mobilize the necessary resources in order to feel in control of their lives.' Patients are able to make a choice by themselves if the ordering system is clear (Edwards, Edwards, & Salmon, 2000). Autonomy is about if patients are able to have the control about eating moments and if they can order food independently. Therefore autonomy can be explained by the flexibility of the food service concept and how understandable and accessible the menu and ordering system are.

Flexibility

Flexibility is about the choice, mealtimes, and moment of choosing a meal (Doorduyn et al., 2015). The food service is one of the few aspects in a hospital where patients have control on. Having a perceived control over a situation influences satisfaction. Hartwell, Edwards, and Beavis (2007) predict that when patients have an increased involvement in the food service process, the satisfaction would be increased. Examples could be control over what to eat, when, and where.

Understandable and accessible system

To be able to make a choice by your own, the ordering system must be clear. Often factors such as poor eyesight, physical disability, dyslexia or problems with the language cause problems with completing menu cards or ordering food. A good explanation of the ordering system is of importance for patients to make independent menu choices, and avoid incorrect orders (Edwards, Edwards, & Salmon, 2000).

2.2.6 Conclusion aspects of food service concepts

As investigated in the literature study, a food service concept consists of different aspects. These aspects are found as most common aspects related to different food service concepts in literature. In table 1 are the aspects and sub-aspects summarized.

Table 1: Aspects and sub-aspects food service concept

Aspect	Sub-aspects
Food quality	Temperature Flavour Texture
Presentation	Colour Portion size and volume Crockery and cutlery
Choice	Within-meal variety Across-meal variety Dietary variety
Service	Appearance Attitude
Autonomy	Flexibility Understandable and accessible system

2.3 Perceived service quality

This literature study started with a description of patient satisfaction. Researchers explored that there is a causal relationship between the perceived service quality and satisfaction (Lee et al., 2000; Woodside et al., 1989; Oliver, 1997). Dagger, Sweeney, and Johnson (2007) state that service quality has a significant impact on service satisfaction. This can be applied on this study. The perceived service quality of the aspects of a food service concept, as discussed in the previous paragraph, is a predictor

for patient satisfaction. Adding behavioural intentions can extend this model. Studies suggest a mediating role of satisfaction in the relationship between the perceived service quality and behavioural intentions (i.e. repurchase intentions). Because of the scope of this study, the behavioural intentions will not be taken into account, since only the perceived service quality and patient satisfaction will be measured. This paragraph will zoom in on the perceived service quality.

2.3.1 Definition of perceived service quality

The perceived service quality is the degree and direction of discrepancy between consumers' perceptions and expectations' (Parasuraman, Zeithaml, & Berry, 1988). Service quality, as perceived by patients, stems from a comparison of what they feel the hospital should offer (i.e., from their expectations) with their perceptions of the performances of the hospital providing the food service (Parasuraman et al., 1988). Expectations are, according to Parasuraman et al. (1988) 'predictions made by consumers about what is likely to happen during an impending transaction or exchange'. Moreover, the service quality is defined as 'a global judgement, or attitude, relating to the superiority of the service' (Parasuraman et al., 1988).

Service quality can be divided into two main categories, what is provided, and how it is provided. Gronroos (1983) defined it as the technical quality and the functional quality, which also corresponds to Berry's approach (1983): the outcome quality and the process quality. Parasuraman et al. (1988) defined 5 dimensions of service quality in the SERVQUAL model, these are visualised and explained in table 2. Parasuraman et al. (1988) use the five dimensions to evaluate the service quality. The SERVQUAL scale measures the expectation-perception gap.

Table 2: Dimensions SERVQUAL model (Parasuraman et al., 1988).

Dimensions	Explanation
Tangibles	Physical facilities, equipment, and appearance of personnel
Reliability	Ability to perform the promised service dependably and accurately
Responsiveness	Willingness to help customers and provide prompt service
Assurance	Knowledge and courtesy of employees and their ability to inspire trust and confidence
Empathy	Caring, the individualized attention the firm provides its customers

The five dimensions of the SERVQUAL model have been criticized because they are difficult to replicate in diverse service contexts. Several studies added or changed dimensions of the original SERVQUAL model to apply it to a healthcare setting (Dagger et al., 2007). Also studies found that it is better to measure only perceptions, instead of using the disconfirmation model that measures both expectations and perceptions (Dagger et al., 2007). Andaleeb and Basu (1994) and Mittal and Lassar (1996) took only the perceptions into account to measure the perceived quality, and ignored the expectations. They found good predictive power in their investigations, and half of the number of items in the measurement tool was needed. Babakus and Boller (1992) and Cronin and Taylor (1992) computed differences scores with perception scores and also found that measuring only perceptions is better than disconfirmation. Also Doorduijn et al. (2015) measured direct perceptions of patients with the food service concept, and they added an extra component, namely the importance of items in the questionnaire, to see what patients perceive as important aspects of the food service concept where the hospital should focus on.

2.3.2 Food service characteristics and perceived service quality

With respect to food services, quality is defined as 'food service that meets nutritional requirements of in-patients' (Kim, Kim, & Lee, 2010). A food service consists of tangible and intangible aspects. The food, presentation of food on the plate, and the menu can be seen as tangibles. Service and autonomy are intangible aspects. In-patients evaluate the perceived food service quality based on these tangible and intangible aspects (Kim et al., 2010; O'Hara et al., 1997). Crosby (1979) defines the quality for tangibles as 'the conformance to requirements'. This definition is insufficient to understand service quality. Important characteristics of services are 'intangibility', 'heterogeneity', 'inseparability', and 'perishability' (Zeithaml, Parasuraman, and Berry, 1985). Intangibility means that a service cannot be

hold or touched like a physical product (Zeithaml et al., 1985). A service can be accompanied by physical elements, like in a food service concept the food. The heterogeneity of services corresponds to the variety of the performance of a service. To illustrate, the service provided by nutrition assistants can vary from day to day through different behaviours (Zeithaml et al., 1985). Inseparability refers to the fact that the presence of the customer is required for providing the service. Contact between the patient and frontline employees is needed (Zeithaml et al. 1985), for example to gain insights in dietary restrictions or to order the food. The perishability of a services means that services cannot be saved, they last for a specific time (Zeithaml et al., 1985).

2.3.2 Conclusion perceived service quality

Perceived service quality with the aspects of a food service concept is found as a predictor for satisfaction with the food service concept, which means that the perceived service quality has a significant influence on satisfaction (Lee et al., 2000; Woodside et al., 1989; Oliver, 1997; Dagger et al., 2007). The literature is unambiguous about how to measure the perceived service quality. The SERVQUAL uses the disconfirmation theory, which evaluated the differences between expectations and perceptions. Several studies have shown that the dimensions of the SERVQUAL model are significant in explaining satisfaction (i.e. Aliman & Mohamad, 2016). However, other researchers investigated that the dimensions are not applicable in all settings (Dagger et al., 2007). Among other researchers, Andaleeb and Basu (1994) found that measuring direct perceptions is better than measuring the difference between expectations and perceptions. Therefore, in this study, the direct perceptions with the food service concept and its' aspects (food quality, presentation, choice, service, and autonomy) will be measured.

2.4 Types of food service concepts

Different types of food service concepts have been identified in literature. The most common food service concepts found in literature are the plated food service concept, the bulk trolley food service concept, and the room service concept. These three types of food service concepts can be seen as basic types; features of other food service concepts are often identifiable with the features of one of these three food service concepts. Below will be elaborated on the plated food service concept, the bulk trolley food service concept, and the room service concept. Features of the different concepts will be described. Thereafter, in the concluding paragraph the features of the different types of food service concepts are linked to the different aspects of a food service concept as found in paragraph 2.2 and summarized in one table.

2.4.1 Plated food service

A traditional food service system is the plated food service. Menu choices will be collected up to 24 hours before consumption. Patients choose their menu from a menu card, written or digital. These choices will be collected at ward level and thereafter centrally, and will be sent to the kitchen where the meals will be prepared. When the meals are plated, they will be transported to the wards in trolleys. Thereafter the meals will be directly served to the patients (cook-hold), or regenerated and served to the patients (Wilson, Evans, and Frost, 2000). Hartwell, Edwards and Beavis (2007) compared the plated food service to the bulk trolley food service. Features of the plated food service are according to them: a large range of menu items available, poor temperature of food, more plate waste, quality presentation, all meals arrive at the same time, the size of helping is less adaptable, and minimal person-to-person interaction. Wilson et al. (2000) found that food wastage is greater in a plated service compared to a bulk food service, and also the energy intake is lower than in a bulk food service. Kuperberg, Caruso, Dello, and Mager (2008) mentioned a few disadvantages of the plated food service, namely the selection of food a long time before consumption, limited food choice, soggy food, and the smell of regenerating plastic trays.

2.4.2 Bulk trolley food service

There are different forms of point of service concepts identified in literature. In these concepts, patients can choose their meal at the moment the meal is provided. The most widely recognised method is the

bulk system, where patients choose their food from a bulk trolley (Mahoney et al., 2009). This bedside meal approach is also known as 'meals on wheels' (Goeminne, De Wit, Burtin, & Valke, 2012). Most hospitals use a buffet trolley car for breakfast and lunch, and have a different method for distributing the warm meals (Van der Meij & Kruizenga, 2016). A bulk trolley method allows patients to select portion sizes they wish. Communication between the patient and staff is needed to make the menu choice. Advantages of this method are, according to Hartwell, Edwards, and Beavis (2007) an attractive presentation of the food, good food temperature, less plate waste, and the food is more like home. The time of serving the food is variable, it has the potential to be staggered. Also the size of helping by frontline employees is variable (Hartwell, Edwards, & Beavis, 2007). Patients fill in a menu card at ward level, which will be used to estimate the amount of food needed. They are allowed to change their mind over the choice at point of service (Wilson et al., 2000). Hartwell, Edwards, and Beavis (2007) investigated that the bulk trolley method enables food to have a better temperature and texture compared to the plated system, because the food will be plated on a later moment.

2.4.3 Room service concept

Room service concepts are adapted from the hospitality industry, and have a large customer-oriented focus (Sheehan-Smith, 2006). In a room service concept patients can order food during the whole day via a call to the nutrition call centre. The order will be sent to the kitchen, and the food will be delivered in a short period of time to the patient (Doorduijn et al., 2015). The biggest advantage of a room service concept according to the literature is the control the patients' have over their food choices. They can decide by their own what to eat, and when. Other advantages mentioned are: improved food temperatures, an increase in the pride in the job of foodservice employees, more food choices, a decrease of food waste, a decrease of the number of complaints, and an improvement in the food quality. Disadvantages mentioned regarding a room service concept are increasing costs, abusing the system by patients who order food for guests, and a repetitive menu (Sheehan-Smith, 2006). Doorduijn et al. (2015) investigated that patients found the food choice more as at home in a room service concept. They also investigated that patients are satisfied with the food supply, presentation, and autonomy (Doorduijn et al., 2015). Kuperberg et al. (2008) stated that the dietary intake of patients and patient satisfaction increased in a room service concept in hospitals due to flexibility of meal delivery, taste, temperature, variety, and quality of foods. The quality of food increased because food was made fresh to order instead of reheated. Williams, Coyle, and Healy (1998) suggest that hospitals more often implement room service concepts due to a reduction of food waste, and fewer patient trays per day. Also Marcason (2012) found that hospital food service departments switch to a room service concept due to a higher satisfaction of patients with the control over their meal preferences and timing, the choices and the food quality and temperature.

2.4.4 Conclusion food service concepts

The most common food service concepts in literature are the plated food service concept, the bulk trolley food service concept, and the room service concept. These concepts differ in how they operate. In the plated food service the menu choices will be collected a long time before dinner, and meals will be served at fixed times, while in the bulk trolley method and room service concept patients can choose their dinner just before consumption. Also differences are found on how the food service concepts operate, for example in the temperature, taste, and service. These differences are all summarized in an overview in table 3.

Table 3: Overview different food service concepts regarding the aspects of a food service concept.

Aspect	Plated food service	Bulk trolley service	Room service
Food quality <i>(Temperature, texture, flavour)</i>	Poor temperature of food (Hartwell, Edwards, & Beavis, 2007) Soggy food (Kuperberg et al., 2008) Smell of regenerating plastic trays (Kuperberg et al., 2008)	Good temperature of food (Hartwell, Edwards, & Beavis, 2007) Good texture of food (Hartwell, Edwards, & Beavis, 2007) Food is more like home (Hartwell, Edwards, & Beavis, 2007)	Good temperature of food (Sheehan-Smith, 2006) Good food quality (Sheehan-Smith, 2006) Food is made fresh to order (Kuperberg et al., 2008)
Presentation <i>(Colour, portion size and volume, crockery and cutlery)</i>	Quality presentation of the food (Hartwell, Edwards, & Beavis, 2007)	Attractive presentation of the food (Hartwell, Edwards, & Beavis, 2007) Portion size is adaptable to patients wishes (Hartwell, Edwards, & Beavis, 2007)	Good presentation (Doorduijn et al., 2015)
Choice <i>(Within-meal variety, across-meal variety, dietary variety)</i>	Limited food choice (Kuperberg et al., 2008) Large range of menu items available (Hartwell, Edwards, & Beavis, 2007) Lower food intake than bulk trolley (Wilson et al., 2000)	Limited menu choice (Hartwell, Edwards, & Beavis, 2007)	Wide food choices (Sheehan-Smith, 2006) Repetitive menu (Sheehan-Smith, 2006) Food choices more as at home (Doorduijn et al., 2015) Large variety (Kuperberg et al., 2008)
Service <i>(Appearance, attitude)</i>	Minimal person-to-person interaction (Hartwell, Edwards, & Beavis, 2007) Size of helping is less adaptable (Hartwell, Edwards, & Beavis, 2007)	Communication is essential in this method (Hartwell, Edwards, & Beavis, 2007) Size of helping can be varied (Hartwell, Edwards, & Beavis, 2007)	Customer oriented focus (Sheehan-Smith, 2006) Increase in pride of service employees (Sheehan-Smith, 2006)
Autonomy <i>(Flexibility, understandable and accessible system)</i>	Menu selection up to 24 hours before consumption (Wilson et al., 2000) Menu selection from a menu card or digital (Wilson et al., 2000) All meals arrive at same time (Hartwell, Edwards, & Beavis, 2007)	Choice at point of consumption (Hartwell, Edwards, & Beavis, 2007) Serving time has the potential to be staggered (Hartwell, Edwards, & Beavis, 2007) Allowed to change choice at point of consumption (Wilson et al., 2000)	Patients can eat what they want and when (Sheehan-Smith, 2006) Patients can order via a call (Sheehan-Smith, 2006) Abusing the system by patients who order food for guests (Sheehan-Smith, 2006)

2.5 Moderating variables

Tucker (2002) suggests that attitudes towards care are moderated by demographic, situational, environmental, and psychosocial factors. So in this research it is relevant to take these factors into account. These variables may moderate in the relationship between the perceived service quality with the food service concept, and patient satisfaction with the food service concept. Fox and Storms (1981) describe a moderating variable as 'a variable that influences the nature of the relation between two other variables'.

2.5.1 Patient related moderating variables

Bélanger and Trudeau (1996) mention gender, age, and perceived health status as personal characteristics that may moderate patient satisfaction with a food service concept. For example older patients are often much more disposed to report a high satisfaction. Younger people often expressed a lower patient satisfaction score with healthcare services (Cohen, 1996). Assumptions from Cohen (1996) for the differences between ages and satisfaction scores are that older patients may have lower expectations with respect to their healthcare because they see themselves as a burden and might feel that they do not need attention. Another assumption is that elderly are treated with more respect by employees, who are often much younger than them, and report therefore a higher satisfaction with healthcare than younger patients (Cohen, 1996).

The literature is unambiguous about the effect of gender on healthcare services and patient satisfaction. Hall and Dornan (1990) evaluated studies about the effects of gender, and they found that four studies showed that women are more positive about healthcare, and five studies showed that men are more satisfied in satisfaction studies with healthcare. So gender has a moderating role, but differs per specific type of relationships that are measured.

Another moderating variable is the type of household, so if people live alone or together with a partner and/or kids. This may influence eating behaviours (Covinsky et al., 1998). People who are used to eat alone have different eating patterns than households with more people. For example, eating alone is associated with an unhealthy dietary, obesity, and underweight. So people in one-person households may be used to different standards, and probably have different expectations of hospital food, compared to people who live together with others (Tani et al., 2015). It can be assumed that patients living alone are used to lower standards, and therefore are more satisfied with the food service. Hall and Dornan (1990) also found that larger family sizes are associated with less satisfaction with healthcare services. Eating behaviours related to the type of household may influence the satisfaction with the food service concept (Covinsky et al., 1998).

The health status of the patient has a small independent effect on the relationship between healthcare and satisfaction according to Jackson et al. (2001); patients who describe themselves as healthy are more satisfied with healthcare than those who report their health as poor. Cohen (1996) investigated the effect of health status in the relationship between the communication in hospitals with staff and patient satisfaction. This study found that pain and poor physical health were found to be significantly associated with lower satisfaction. Tranter, Gregoire, Fullam, and Lafferty (2009) investigated if patient written comments help to explain patient satisfaction with food quality. A moderator taken into account was the perceived health status. They found the opposite as stated before, patients who rated their health status as poor gave much higher ratings for food quality when compared with patients who perceived their health status as very good (Tranter et al., 2009). They assume that these discharged patients are more satisfied because they were able to recover and return back home. The global health status can be described as how patients feel on a certain moment, and can be measured on a scale from bad to good (Covinsky et al., 1998). Poor mental states, like psychological distress or personality disorders lead also to lower levels of satisfaction (Jackson et al., 2001).

Another socio-demographic moderator is according to Hall and Dornan (1990) education. Less educated patients are often more satisfied with healthcare than high-educated patients. They found that being older, having less education, having a high social status and being married is associated to a greater satisfaction with healthcare. Also Sahin, Yilmaz, and Lee (2007) investigated that patients with a higher educational level report a lower patient satisfaction with healthcare in general, than those with a lower

educational level. An explanation for this could be that patients with a higher educational level have higher expectations from healthcare. Patients with lower educational levels have less knowledge about the services available and are more satisfied (Sahin et al., 2007).

Another moderating variable in the relationship between the perceptions with the food service concept and patient satisfaction is the ethnic background or religion. Muslims do not eat pork and Jews have to eat kosher food. This may limit the menu choices and reduces the food acceptability, and may influence patient satisfaction (Johns et al., 2013). Benjamins (2006) found that higher levels of religious salience are related to a higher satisfaction with healthcare, even after that demographic, social, and health variables are taken into account. Also Jacobs (2015) found that religion has an influence on patient satisfaction, indicating that when people are non-religious, a lower patient satisfaction could be expected.

To summarize, moderating variables related to the patient are: gender, age, type of household, education, religion, and perceived health status. These all may have an influence on the relationship between a food service concept and patient satisfaction. Tucker (2002) suggested that attitudes towards care are also be moderated by environmental factors. Engelund et al. (2007) stated that the physical environment has an influence on satisfaction of patients. The effect of the physical environment will be explained in the following paragraph.

2.5.2 Environment related moderating variables

The dining environment influences the satisfaction of patients with the food served (Engelund et al., 2007). Bitner (1992) suggests that satisfaction may be influenced by the physical setting in which the service takes place. Bitner proposes a direct relation between satisfaction and the physical environment. A few studies see the dining environment (Engelund et al., 2007) as part of the food service concept, but a number of studies do not include the physical environment as part of the food service concept that influences patient satisfaction (among others: Johns et al., 2013); Hartwell, Edwards, and Symonds, 2006; Edwards, Edwards, & Salmon, 2000). Therefore, in this study, the physical environment is seen as a moderating variable in the relationship between a food service concept and patient satisfaction. Bitner (2002) made a framework about the impact of physical surroundings on customers and employees. She distinguishes three environmental dimensions: ambient conditions, space and function, and signs, symbols, and artefacts. The ambient conditions are about temperature, lightning, noise, music, comfort, and scent. These ambient conditions have influences on for example the food intake and eating behaviour (Bitner, 1992; Kasof, 2002; Fiegel, Meullnet, Harrington, Humble, & Seo, 2014). The spatial layout refers to how machinery, equipment and furnishing are arranged, and the functionality refers to the ability of the same items to facilitate performance and the accomplishment of goals (Bitner, 1992). Signs, symbols, and artefacts are important for patients to form a first impression of the hospital (Bitner, 1992).

2.5.3 Conclusion moderating variables

Demographic, situational, environmental and psychosocial factors are found as moderating variables between the relationship of a food service concept and patient satisfaction. It is possible that patients give different scores to patient satisfaction with a food service concept in different circumstances. For example, if patients do not feel well (perceived health status) they may perceive a lower food quality than when they feel well. The moderators that will be taken into account in this study are: gender, age, type of household, education, religion, perceived health status, and the physical environment. The significance of these moderators must be measured in the empirical study, because the strength of each independent moderator is probably variable.

2.6 Conceptual model

The conceptual framework is visualised in figure 2. The framework shows two distinct constructs; the food service concept, and patient satisfaction with the food service concept. The independent variable in the figure is the food service concept, which consists of different aspects. The literature study showed five main aspects of a food service concept: food quality, presentation, service, choice, and autonomy. These different aspects are in literature divided into different sub-aspects, for example food quality consists of temperature, flavour, and texture. These aspects can be assessed by patients, to measure the perceptions with these different aspects of a food service concept. It is assumed that the perceived service quality with these aspects has an influence on the patient satisfaction with the food service concept. The higher the perceived service quality is, the higher the patient satisfaction is (i.e. Oliver, 1997). However, the relationship between the perceived service quality with the different aspects and patient satisfaction could differ per aspect, not all aspects may have an equally powerful effect on patient satisfaction with the food service concept.

It is found in literature that aspects are executed in different ways in different types of food service concepts. The plated food service, bulk trolley method, and room service concept show different features related to the aspects. To illustrate, using autonomy as an example, patients in a room service concept can eat what they want and when, while patients in a plated food service have to choose their dinner a few hours before consumption and receive food at fixed times (Wilson et al., 2000; Sheehan-Smith, 2006).

Probably, the relationship between the perceived service quality with the food service concept and patient satisfaction is moderated by demographic, situational, environmental, and psychosocial factors. The environmental factors are translated into the physical environment. This is summarized in one aspect, because it is not the goal of the study to investigate the extended relationship between the food service concept, the physical environment, and patient satisfaction. The other factors are related to the patient, in literature is found that gender, age, type of household, education, religion, and perceived health status probably influence the relationship between the perceived quality of the food service concept, and patient satisfaction. These moderating variables could influence how patients perceive the aspects of a food service concept on a certain moment with certain circumstances, for example: if patients do not feel well they may perceive the taste of food different than when they feel well. The strengths of the different moderators did not become clear from the literature study, these may be variable per moderator.

This conceptual framework will be used to analyse three different food service concepts in different hospitals, and to develop a questionnaire and measure and analyse patient satisfaction scores between the different food service concepts.

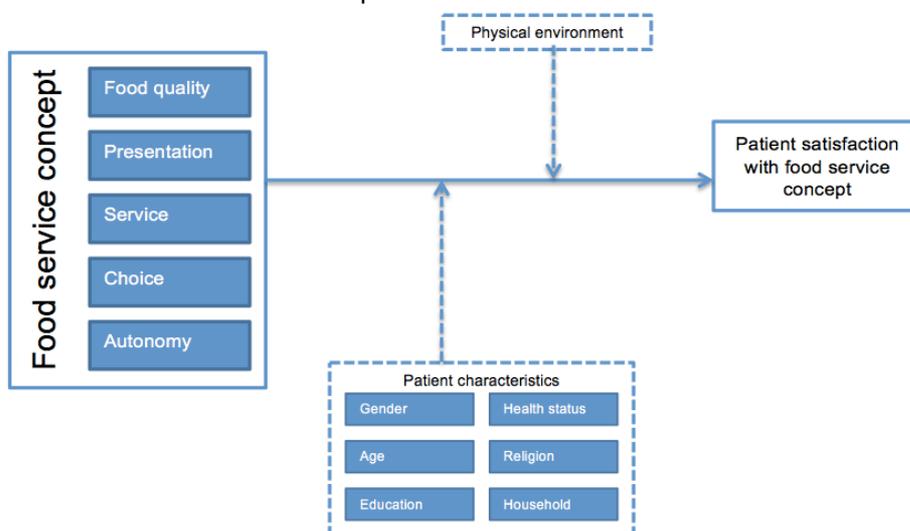


Figure 2: Conceptual framework

3. Research methodology

This chapter describes the data collection methods of the empirical study. The purpose of the empirical study is to provide insights in how patients value the three different food service concepts by measuring the perceived quality with the aspects of a food service concept, and by measuring patient satisfaction. Questionnaires are distributed to patients who assessed the food service concepts. Interviews and observations are done to analyse the food service concepts. This chapter describes the methods to gain this data, the analysis of results, and the reliability and validity of this study.

3.1 Construction of questionnaire

A questionnaire is composed to measure the perceived service quality of the food service concepts and patient satisfaction in three hospitals. In all three hospitals the same questionnaire was distributed to gain comparative data. The researcher took the questionnaires personally. The questionnaire was composed according to the aspects of a food service concept as found in the literature study, namely: food quality, presentation, choice, service, and autonomy. Several researchers (i.e. Doorduijn et al., 2015; Capra et al., 2005) used a questionnaire to measure the perceived quality with a food service concept and patient satisfaction. The validated questionnaires of these studies were used as examples for this study, and some questionnaire items are adopted in this study.

3.2.1 Translation of aspects to measurable items

The aspects and sub-aspects of a food service concept are used to develop a questionnaire. The questionnaire starts with general questions about the patient, based on the moderating variables as found in the literature study. Three additional items, not found in the literature study, are added to the questionnaire, namely about dietary restrictions, the current length of hospital stay and the experience in the hospital in general. The dietary restrictions are of importance in this study because they may limit the menu choice, and therefore probably the perceived service quality with this aspect. The length of stay may also be related to the choice of food, because the across-meal variety and dietary variety (food choice over a longer period) may be monotonously for patients who stay for a longer period in the hospital. The experience in the hospital in general is added because if patients experience the hospital stay as bad, this may probably also have effects on the satisfaction with the services provided (Doorduijn et al., 2015). The last question in general information is about the physical environment. It is decided to measure this moderating effect in one question, because it is not the objective of the questionnaire to measure the detailed impact of the physical environment on the relationship between the food service concept and patient satisfaction. Visual aspects for the patients are summarized in one question. Table 4 below shows the questions in the questionnaire and answer options.

Table 4: General questions

Aspect and question(s)	Measurement scale / answer categories
Gender What is your gender?	Male Female
Age What is your age?	Number
Type of household What type of household do you have?	One person household Living together with partner Living together with parent and kid(s) Living together with kid(s) Other
Religion What is your religion?	Christianity Judaism Islam No religion Other

Education level What is your highest level of education?	No education Primary school Lower vocational education Intermediate vocational education Higher vocational education Academic education
Dietary restrictions Are there any dietary restrictions for you?	No restrictions Vegetarian Sodium Vegan Gluten Halal Lactose Kosher Diabetes Other Fluid
Length of stay How long do you stay in the hospital at this moment?	1 2 3 4 5 >5
Perceived health status/ wellbeing How do you feel?	Poor Moderate Fair Good Very good
Experience stay How do you experience the stay in the hospital? (Doorduijn et al., 2015)	Poor Moderate Fair Good Very good
Physical environment How do you value the patient room (devices, acoustics, lightning, temperature) wherein you stay?	Poor Moderate Fair Good Very good

After the general information, the perceived quality with the aspects of a food service concept will be measured. Patients have to express their opinion on different items related to the aspects. The questionnaire covers all the sub-aspects found in the literature study, translated into items that are assessable by patients, and supplemented with items found in the studies of Doorduijn et al. (2015), and Capra et al. (2005) that are of relevance for this study. The tables below show the questionnaire items, and an explanation in how they are translated from literature to the questionnaire.

Table 5: Food quality

Aspect	Translation into questionnaire
Food quality (taste, temperature, texture)	Taste Temperature Preparation (Capra et al., 2005) Freshness

Food quality will be assessed by the aspects taste, and temperature as found in the literature study. The texture will be measured by the aspects preparation and freshness, because 'texture' may be a confusing term for patients (Capra et al., 2005).

Table 6: Presentation

Aspect	Translation into questionnaire
Presentation (colour, portion size and volume, crockery and cutlery)	Presentation on plate (i.e. colour) Portion size (Capra et al., 2005) Crockery and cutlery

The presentation will be measured by the presentation on plate (i.e. colour), portion size, and crockery and cutlery. These items correspond to the items as found in the literature study.

Table 7: Choice

Aspect	Translation into questionnaire
Choice (Within-meal variety, across-meal variety, dietary variety)	Menu per day Healthy choices (Capra et al., 2005) Vegetarian choices Menu variation >1 day Choice in drinks (Doorduijn et al., 2015) Choice in snacks (Doorduijn et al., 2015)

The choice will be measured by the within meal variety, across-meal variety, and dietary variety. These terms are probably not common for patients, and therefore translated into other terms. As found in the literature study, the within-meal variety refers to the variety of components in a meal, so for example if these choices are healthy, vegetarian, and the choices in drinks and snacks. The across-meal variety is about the choices across a day, so the menu per day. The dietary variety refers to the variety over a longer period, so the menu variation longer than one day.

Table 8: Service

Aspect	Translation into questionnaire
Service (appearance, attitude)	Explanation about food service concept Help by making a food choice Motivation to eat Appearance Help by eating Possibility for visitors to eat with patient Complaint handling

Appearance and attitude are also translated into more specific items. The appearance is measured by the appearance (tidiness and clearness) of frontline employees like nutrition assistants. 'Explanation about food service concept', 'help by making a food choice', 'motivation to eat', 'help by eating', and 'complaint handling' are related to the attitude of frontline employees, as found in the literature study. The possibility for visitors to eat with the patients is extra added. In the literature study it was investigated that the intake of the amount of food for patients increases when assistance is provided, this help could also be offered from visitors.

Table 9: Autonomy

Aspect	Translation into questionnaire
Autonomy (flexibility, understandable and accessible system)	Moments of food provision Flexibility Clearness of order system

Autonomy consists, as found in the literature study, of the flexibility and how understandable and accessible the order system is for patients. Flexibility is in this case divided into the moments of food provision, and the flexibility of these moments (the possibility to deviate from the standard moments). 'Clearness of the order system' indicates if the system is understandable and accessible for patients.

3.2.2 Likert scale

A 7-point Likert scale is used in the questionnaire, so that patients could assess the perceived quality of the aspects of a food service concept. The answer options are categorized from 'very bad' to 'very good', where a higher score refers to a more positive perception of the item. The Likert scale is a common used scale in questionnaires. It is appropriate for this study to investigate if there are gradations in perception scores for the different aspects of a food service concept (De Vaus, 2001). A 7-point scale is chosen because several studies found that a 7 point-scale is most reliable in comparison with for example 5 or 10-point scales. (Dawes, 2012; Preston and Colman, 2000; Symonds, 1924). In the questionnaire also the option 'not applicable' is added for each item, for patients who could not express their opinion about a certain item. It is possible that patients did not experience all items, or were not able to give a perception score for an item. For example, if patients do not order the food by themselves, they are not able to assess the menu choices and the clearness of the order system.

3.2.3 Importance of aspects

Patients had also to assess how important they found the main aspects (food quality, presentation, choice, service, and autonomy), by answering the question: How important do you find *-aspect-*? Also for this question a 7-point scale is used from 'very unimportant to very important. This question is added after each aspect to see if patients find certain aspects of the food service concept important. This information can be used to give recommendations as done in the study of Doorduijn et al. (2015).

3.2.4 Patient satisfaction

After the assessment of the perceived quality of the different aspects of a food service concept, patients had to indicate their level of patient satisfaction with the food service concept, expressed in a mark on a scale ranging from 1 to 10. This satisfaction score is about the total food service concept, so may include also other aspects that are not mentioned in the questionnaire. It may be possible that patients base their score also on other items that are not found in the literature study as part of the food service concept and thus are not included in the questionnaire. At the end of the questionnaire is space for comments and suggestions. The questionnaire is added in appendix 1.

3.2 Analysis of food service concepts

An analysis of the three food service concepts is made on the basis of the aspects of a food service concept as found in the literature study. The analysis is based on interviews with employees involved in the food service concepts in the three hospitals, and due to observations by the researcher. Factual and objective information about the characteristics of the food service concepts is gained. Defining features of the food service concepts per aspect led to a same table as in the literature study. The information gained can be used to explain for the perceived quality scores and differences between the three food service concepts.

3.2.1 Interviews

In each hospital are interviews conducted with employees involved in the food service concept to gain information about the food service concept. The interviewed employees work on different levels, so insights are provided on strategic, tactical, and operational level. The target population for the interviews consisted of managers who are responsible for the food service concepts, external providers (in case the food service concept was outsourced to an external provider) and operational employees who work with the food service concept like nutrition assistants. In total nine interviews are conducted as shown in the table below.

Table 10: Interview respondents

	Hospital 1	Hospital 2	Hospital 3
Manager food service concept	Sector manager food, beverages and hospitality	Hospitality manager	Project manager
External provider	-	Location manager external provider	Operational manager external provider
Operational level	Nutrition assistant	Nutrition service centre employee Care assistant	Nutrition assistant

In hospital 2 and 3 is the food service concept of an external provider. The food service concept of hospital 1 is in-house, so therefore no external provider was interviewed. Hospital 2 has no so called 'nutrition assistants', but divided this role in two functions: nutrition service employee and care assistant. Therefore, two interviews were conducted on operational level. The employees were asked to give answers to questions about the aspects of a food service concept. Besides these main questions other questions have been asked to gain more in-depth information about the context of the food service concept. The goal was to gain only factual and objective information. By defining the features of a food service concept per aspect, a same table as in the literature study can be made about the analysed food service concepts. The questions as provided in table 11 are asked to the employees. For each question an explanation is asked.

Table 11: Interview questions for analysis food service concepts

Aspect and sub-aspects	Interview questions	Measurement scale or answer category
Food quality		
Temperature	How is the temperature of the food?	Open question
Flavour	How is the taste of the food?	Open question
Texture	How is the texture of the food? Is the food fresh prepared?	Open question Yes/no, and explanation
Presentation		
Colour	Are there colour variations in the food?	Yes/no, and explanation
Portion size and volume	How large are the portions? Can patients decide on the volume?	Open question Yes/no, and explanation
Crockery and cutlery	What kind of crockery and cutlery do you use?	Open question
Choice		
Within-meal variety	Can patients choose between different meals?	Yes/no, and explanation
Across-meal variety	Can patients choose between different components within a meal?	Yes/no, and explanation
Dietary variety	How large is the supply (choices) of food daily? Do the choices for food vary over days? Do you use a menu cycle for a few days?	Open question Yes/no, and explanation Yes/no, and explanation
Service		
Appearance	How do the frontline employees appear? (cleanliness, neatness, outfit)	Open question
Attitude	Are the frontline employees hospitable? Do the frontline employees help patients with making a food choice? Do frontline employees help patients with eating (cutting food, making sandwiches)? Is it possible for visit or family to eat with the patient?	Yes/no, and explanation Yes/no, and explanation Yes/no, and explanation Yes/no, and explanation
Autonomy		
Flexibility	On which times do patients get food and drinks? How often get patients food and drinks?	Open question Open question

Understandable and accessible system	Is it possible to differ from these moments?	Open question
	How can the patient order food or drinks?	Open question
	Is the system explained to patients?	Yes/no, and explanation

3.2.2 Observations

The answers on the interview questions are supplemented with observations to create a total overview of the food service concept. In this research a non-participative structured observation is done. The food managers organized a walk-trough in the hospital, to gain insights in the food provision process. Besides the walk-trough, in all three the hospitals observations have been done on the orthopedics department during one day to see the breakfast, lunch, and dinner. The following aspects are observed:

Table 12: Observation aspects

Aspect	Observation
Preparation of food	Walk-through with food manager about the food service process
Colour Portion size and volume Crockery and cutlery	Walk-through with food manager / Observation on wards
The menu	Walk-through with food manager / observation of the menu cycle
Appearance and attitude of frontline employees	Observation on wards
Order system	Walk-through with food manager

3.3 Sample size and criteria

The questionnaire consists of 23 items. For doing a factor analysis, 5 to 10 times the number of items is the number of respondents needed (115 to 230 patients). Therefore the goal was to collect about 200 completed questionnaires in total in all three hospitals together. Only patients from the department orthopaedics/surgery, lung diseases and oncology are included in the research to gain data from the same type of patients. Other inclusion criteria are: patients are 18 years and older, patients have a Dutch nationality, and patients have consumed a meal. The patients are not informed beforehand the data collection. The researcher took the questionnaires personally, and when possible the patients received a hand-out to read the questions by their own. The survey completion time took between five and ten minutes.

3.4 Data analysis

The interviews are recorded and transcribed. Thereafter a table was made based on the sub-aspects of a food service concept, and information from the interviews was labelled and coded and transformed into the table. The information from the observations was also transformed into a table.

Data gained from the questionnaires was analysed in SPSS Statistics. Descriptives per hospital are analysed. A factor analysis over the whole dataset is performed to reduce the observed correlated variables. With a regression analysis insights are created in which factors have an impact on patient satisfaction. A Mann Witney-U test is performed to compare the mean perception scores of the different food service concepts to each other.

3.5 Reliability, validity, and ethical accountability

This paragraph discusses die quality of the research by assessing the reliability and validity. The reliability refers to the methods and measurements, that the study will generate the same results if repeated under the same conditions. The validity consists of the internal and external validity. The internal validity refers to if the research design can sustain the causal conclusions the research aims for. The external validity refers to if the results are likely to apply more widely (De Vaus, 2001).

3.5.1 Reliability

To ensure the reliability, this study is conducted in a structured way. A triangulation of methods is applied in the empirical study; interviews, observations and a questionnaire are methods used. The interviews were semi-structured, so a consistent way of questioning is conducted so that answers will be the same when doing it over again. It was not possible to avoid subjective answers in the interviews, because some items, for example 'taste', are personal. Therefore interviews found place on different levels, and observations are done to check the answers. The reliability of the questionnaire was ensured to aim for a large sample (>200 respondents), and the aim for an approximately equal distribution of respondents among the hospitals and departments. Before distributing the questionnaire it was tested among different people to see if questions were interpreted in a uniform way and to check the completion time. This lasted for about 7 minutes. This time is appropriate, because patients had to keep their attention at the questionnaire. The researcher had to take all the questionnaires personally, so that there would be no difference in the method of distributing or asking the questions. The medical staff had to assess which patients were appropriate for participating in the questionnaire. All patients that met the criteria for the questionnaire could be included in the sample.

3.5.2 Validity

Defining key concepts in the literature study ensured the internal validity, so that no confusion arose about the meaning of different concepts and terms. Also diverse sources are used in the literature study to develop the empirical study. Using a large sample in the questionnaire ensures the external validity. Therefore it is possible to make general statements about the three food service concepts.

The age group in hospitals is quite high; therefore it is probably not possible to make statements for all age groups about patient satisfaction with food service concepts.

3.5.3 Ethical accountability

All patients were able to participate voluntarily in the study, and the medical staff or research asked the patients if they wanted to participate in the study. Patients were informed before answering the questions about the goals of the research, and the anonymity of their answers. When patients wanted to stop halfway the questionnaire, for example if they did not feel well, this was possible. Not completed questionnaires were invalid.

4. Results

This chapter contains the results of the empirical study. Research questions that will be answered in this chapter are:

- How are the different food service concepts executed based on the aspects of a food service concept?
- How do patients in different hospitals evaluate the different aspects of the food service concept at hand?
- What explains for these possible differences between patient satisfaction levels with different food service concepts?

The results of the interviews and observations give insights in how the food service concepts are executed in the different hospitals, described according to the aspects of a food service concept. Thereafter insights are given in the results of the questionnaire to measure patient satisfaction with the three different food service concepts.

4.1 Interviews and observations

Three different hospitals are included in this study. Hospital 1 and hospital 2 are general hospitals, and hospital 3 is an academic hospital. Interviews are conducted with employees on different levels in the three hospitals to gain an understanding on how the food service concepts are executed according to the aspects of a food service concept as found in literature. Also observations are done to analyse the food service concepts, during one day in each hospital at the orthopaedics department in each hospital. All information in this paragraph is derived from the interviews and observations.

The food service concepts have different aims. The main goal of hospital 1 is to offer a hospitable system that meets the food requirements of patients. Breakfast and lunch are offered from a buffet trolley car, and a cook-hold system is used to provide fresh cooked meals to patients. The food service is executed under own management. Hospital 2 has the aim to give patients the control on what to eat and when. Patients can order between 7 am and 6.15 pm the food they want from a menu card. The meals will be delivered within 45 minutes. The concept is from an external provider, the employees are in-house. The food service concept of hospital 3 focuses on tasty food that contributes to the wellbeing and recovery of patients. Nutrition assistants provide six to seven times a day small meals to patients, and they can choose between three or four nicely presented meals. The food service concept and employees are outsourced to an external provider. In the table below (table 13) are the food service concepts described based on the aspects as found in the literature study. The information is gained from the interviews and observations. In appendix 2 and 3 are more extensive tables enclosed with obtained data from the interviews and observations.

Table 13: Analysis of food service concepts

Aspect	Hospital 1	Hospital 2	Hospital 3
Type of food service concept	Pre-plated cook-hold, buffet trolley for breakfast and lunch	Room service concept	Six to seven times a day small meals
Food quality <i>(Temperature, texture, flavour)</i>	Preparation of food with fresh ingredients. Good flavour, texture and temperature of food due to cook-hold method.	Potatoes and vegetables are salt free. 75-80% fresh ingredients. Temperature is not always optimal. Texture of food is adjusted to older age group (well-done).	Cook-chill method. Meals are ready made delivered to the hospital. Food is often salt free. Temperature of snacks is sometimes poor.
Presentation <i>(Colour, portion size and volume, crockery and cutlery)</i>	Dinner is served in small pans. Use of porcelain bowls and glasses for salads and desserts. As much colour variations as possible on a plate. Patients can choose between small, normal or large portion sizes.	Dinner is served on a plate with a warming cover. As much as possible served in bowls. Colour variation depends on the choices of the patient. Patients can choose between a half, whole or one and a half portion sizes.	Breakfast, lunch and snacks are served on little plates, glasses, and porcelain bowls. Dinner is served in little pans. Small portion sizes. Use of colour variations in presentation and different placemats. Nutrition assistants show options on a serving tray.
Choice <i>(Within-meal variety, across-meal variety, dietary variety)</i>	14-day-food-cycle. Breakfast, lunch and drinks are served with buffet trolley car with different choices for sandwiches and filling, yoghurt, drinks, fruits and one soup. Dinner choice between different components and daily menu of the chef. Seasonal products are added in the menu cycle.	Menu with different components whereof patients can compose their own meals. This menu is approximately the same along the year. Extra daily menu with seasonal products in summer, autumn, winter and spring cycle.	14-day-food-cycle. Patients get six to seven times a day the option to choose between 2-4 small meals. Left-overs of the day before can be served one day later. For breakfast choice from buffet trolley car with daily extras. Shakes round, lunch round, snack round, dinner round and evening round. Meals are adjusted to the seasons.

<p>Service <i>(Appearance, attitude)</i></p>	<p>Nutrition assistants serve meals and drinks to patients and order dinner for them. Way of working of different nutrition assistants is not in one line on whole hospital. Nutritional assistants have all the same outfit, different from the care employees.</p>	<p>Nutrition call centre employees receive orders from patients. Hospitality employees deliver food to patients. Care-assistant helps patients (when needed) with ordering food and eating. Employees have an advising role, they cannot force patients to make a certain food choice. Nutrition call centre employees are not visible for the patient. Hospitality employees have all the same outfit different from the care employees. Care-assistant wears the same outfit as nurses.</p>	<p>Nutritional assistants provide foods to patients and advise patients on what meal is most appropriate for the recovery of the patient. Nutrition assistants wear an outfit from the external provider.</p>
<p>Autonomy <i>(Flexibility, understandable and accessible system)</i></p>	<p>Times for eating moments are fixed. Patients can choose their dinner till 3pm. If patient is absent nutrition assistant comes back later nutrition assistant records the choice for dinner in a tablet. Assortment of buffet trolley car and drinks is visible in bedside terminal nutrition assistant drives buffet trolley car in patient room so that patients can see the choices. Patients get only choices appropriate for their diets.</p>	<p>Patients can order between 7am and 6.15 pm what and when they want from the menu card. In the evening nurses can deliver drinks from the pantry. Care-assistant helps people who require help with ordering, or the family can order food for the patients (from home). Patients get an explanation about the food service concept at the intake. Patients with diets receive separate menu cards.</p>	<p>Nutrition assistant provides six to seven times a day food on fixed times. Little deviation of these moments is possible. The nutrition assistant offers all foods and choices personally. In the afternoon the nutrition assistant will ask the choice for dinner.</p>

From the information gained differences are found between the three different food service concepts. The analysis of food quality shows that temperatures may be poor in hospital 2 and 3. The food quality of hospital 1 is good according to the employees. Differences are found in the presentation of the food. Hospital 1 and 3 focus on presentation by serving food in pans and glasses, while hospital 2 uses more typical hospital food trays. Also differences are found in the menu choices. Hospital 1 and 3 both use a 14-days cycle that includes meals adjusted to the seasons. The menu choices per day are limited compared to the menu of hospital 2 that consists during the whole year of an extended list of separate components, and additional menus with seasonal meals. In all three hospitals the frontline employees that are responsible for the food provision are recognizable due to their outfits. There are differences found in the type of employees. In hospital 1 and 3 are typical nutrition assistants, hospital 2 has a more complex system with a nutrition call centre employee, a hospitality employee en care-assistants who are all responsible for the food provision. The autonomy for patients related to the food service concept differs per hospital. Hospital 2 gives patients the control on what to eat and when, and they have an order system that enable patients to order when and what they want. Hospital 1 and 3 have fixed times and limited menus for patients, and patients are dependent on nutrition assistants to get food or drinks. This analysis is based on objective information. The results show that the hospitals all three have different ways in how the aspects are executed with respect to the goals of the food service concepts. These differences per food service concept may lead to differences in perception scores of patients with the different items of a food service concept. These perception scores are shown in the following paragraph, wherein the results of the questionnaire are shown.

4.2 Questionnaire

206 respondents participated in the questionnaire divided among three hospitals, as shown in table 14.

Table 14: Number of respondents

	Frequency	Per cent
Hospital 1	65	31,6
Hospital 2	71	34,5
Hospital 3	70	34,0
Total	206	100,0

In all three hospitals patients are approached on the same departments: oncology, lung diseases, and orthopedics. These departments in all three hospitals have about the same number of occupation. Data collection found place from the 2th of May 2016 till the 9th of June 2016.

4.2.1 Descriptives

The descriptives are given in the table below. The first column represents the variables measured, this are the moderators as found in the literature study.

Table 15: Descriptives

	Hospital 1 (N=65)	Hospital 2 (N=71)	Hospital 3 (N=70)
Mean age	63,20 (SD = 13,25)	66,23 (SD = 12,27)	57,30 (SD = 15,19)
Gender			
Male	43 (66,2%)	38 (53,5%)	37 (52,9%)
Female	22 (33,8%)	33 (46,5%)	33 (47,1%)
Departments			
Oncology	18 (27,7%)	23 (32,4%)	19 (27,1%)
Lung diseases	16 (24,6%)	29 (40,8%)	25 (35,7%)
Orthopedics	31 (47,7%)	19 (26,8%)	26 (37,1%)
Type of household			
Lone parent family	16 (24,6%)	17 (23,9%)	11 (15,7%)
Living together with partner	35 (53,8%)	42 (59,2%)	42 (60%)

Living together with parent and kid(s)	11 (16,9%)	10 (14,1%)	9 (12,9%)
Living together with kid(s)	3 (4,6%)	2 (2,8%)	2 (2,9%)
Other	0 (0,0%)	0 (0,0%)	6 (8,6%)
Religion			
Christianity	39 (60,0%)	36 (50,7%)	33 (47,1%)
No religion	22 (33,8%)	32 (45,1%)	37 (52,9%)
Other	4 (6,2%)	3 (4,2%)	0 (0,0%)
Education			
No education	1 (1,5%)	0 (0,0%)	1 (1,4%)
Primary school	5 (7,7%)	6 (6,8%)	2 (2,9%)
Lower vocational education	21 (32,3%)	16 (22,5%)	10 (14,3%)
Intermediate vocational education	20 (30,8%)	32 (45,1%)	36 (51,4%)
Higher vocational education	15 (32,1%)	15 (21,1%)	16 (22,9%)
Academic education	3 (4,6%)	2 (2,8%)	5 (7,1%)
Dietary restrictions			
None	50 (76,9%)	57 (80,3%)	61 (87,1%)
Diabetes	6 (9,2%)	3 (4,2%)	5 (7,1%)
Sodium	3 (4,6%)	6 (8,5%)	1 (1,4%)
Fluid	1 (1,5%)	0 (0,0%)	0 (0,0%)
Vegetarian	1 (1,5%)	1 (1,4%)	0 (0,0%)
Gluten	0 (0,0%)	1 (1,4%)	0 (0,0%)
Lactose	0 (0,0%)	2 (2,8%)	1 (1,4%)
Other	4 (6,2%)	1 (1,4%)	2 (2,9%)
Length of stay			
1	3 (4,6%)	3 (4,2%)	2 (2,9%)
2	8 (12,3%)	24 (33,8%)	13 (18,6%)
3	7 (10,8%)	17 (23,9%)	12 (17,1%)
4	8 (12,3%)	8 (11,3%)	15 (21,4%)
5	9 (13,8%)	4 (5,6%)	9 (12,9%)
>5	30 (46,2%)	15 (21,1%)	19 (27,1%)
Perceived health status			
Poor	4 (6,2%)	2 (2,8%)	5 (7,1%)
Moderate	8 (12,3%)	12 (16,9%)	15 (21,4%)
Fair	29 (44,6%)	21 (29,6%)	23 (32,9%)
Good	21 (32,3%)	34 (47,9%)	25 (35,7%)
Very good	3 (4,6%)	2 (2,8%)	2 (2,9%)
Experience stay			
Poor	0 (0,0%)	0 (0,0%)	0 (0,0%)
Moderate	1 (1,5%)	1 (1,4%)	1 (1,4%)
Fair	8 (12,3%)	1 (1,4%)	1 (1,4%)
Good	46 (70,8%)	48 (67,6%)	54 (77,1%)
Very good	10 (15,3%)	21 (29,6%)	14 (20%)
Physical environment			
Poor	0 (0,0%)	1 (1,4%)	1 (1,4%)
Moderate	3 (4,6%)	1 (1,4%)	3 (4,3%)
Fair	12 (18,5%)	9 (12,7%)	13 (18,6%)
Good	44 (67,7%)	58 (81,7%)	48 (68,6%)
Very good	6 (9,2%)	2 (2,8%)	5 (7,1%)

The comparison of the three hospitals based on the descriptives led to the following results. The distribution of respondents over the hospitals is approximately even as can be seen in table 15. The distribution of respondents over the departments differs per hospital. Because of the occupation it was not possible to distribute the same number of questionnaires per department. The mean age is lowest in hospital 3. The male/female ratio is in hospital 2 and 3 is about equal, and in hospital 1 is the number of male respondents higher. The length of stay is on average highest for patients in hospital 1. On all the other variables are the hospitals comparable since the distribution of answers is approximately the same.

4.2.2 Mean scores

The table below shows the mean scores and standard deviations per item in the questionnaire, this represents the perceived quality per sub-aspect according to the respondents.

Table 16: Mean scores per survey item

	Hospital 1	Hospital 2	Hospital 3
	Mean ± Std. Dev. (N)	Mean ± Std. Dev. (N)	Mean ± Std. Dev. (N)
Food quality			
Taste	5,73 ± ,94 (63)	5,74 ± 1,03 (70)	5,82 ± 1,04 (68)
Temperature	5,97^a ± ,79 (65)	5,69 ± ,86 (70)	5,91 ± ,94 (70)
Preparation	5,86 ± ,83 (65)	5,67 ± ,81 (70)	5,78 ± ,93 (68)
Freshness	5,72 ± 1,05 (65)	5,63 ± ,89 (70)	5,94 ± ,72(70)
Presentation			
Presentation	6,02 ± ,54 (65)	6,03 ± ,39 (68)	6,17 ± ,72 (70)
Portion sizes	5,71 ± ,91 (65)	6,00 ± ,48 (71)	5,77 ± ,97 (70)
Crockery and cutlery	5,91 ± ,61 (65)	6,03 ± ,17 (71)	6,00 ± ,74 (70)
Choice			
Menu per day	5,75 ± 1,08 (65)	6,55 ± ,56 (71)	5,81 ± ,82 (70)
Healthy choices	5,95 ± ,56 (61)	6,18 ± ,42 (71)	5,91 ± ,57(66)
Vegetarian choices	5,73 ± ,94 (30)	6,08 ± ,67 (38)	5,88 ± ,40 (40)
Menu variation period	5,78 ± ,98 (59)	5,92 ± ,62(66)	5,85 ± ,73 (60)
Drinks	5,78 ± ,99 (65)	6,08 ± ,37 (71)	5,96 ± ,60(70)
Snacks	5,89 ± ,57 (63)	5,97 ± ,76 (71)	6,21 ± ,56 (68)
Service			
Explanation	5,89 ± ,87 (65)	6,07 ± ,40(69)	5,60 ± 1,30 (70)
Help making choice	5,93 ± ,56 (58)	6,05 ± ,50(61)	5,98 ± ,43 (61)
Motivation	5,95 ± ,92 (59)	6,02 ± ,52 (57)	5,86 ± ,67 (57)
Appearance	6,20 ± ,47 (65)	6,10 ± ,34 (71)	6,13 ± ,38 (70)
Help eating	6,08 ± ,53 (40)	6,03 ± ,31 (32)	5,91 ± ,74 (35)
Visit	5,45 ± 1,06 (31)	6,13 ± ,42 (63)	6,09 ± ,78 (47)
Complaint handling	5,80 ± ,68 (41)	5,85 ± ,65 (31)	5,73 ± ,73 (37)
Autonomy			
Moments and frequency	5,58 ± ,98(65)	6,11 ± ,87(71)	5,83 ± ,88 (70)
Flexibility	5,62 ± 1,15 (58)	6,37 ± ,49(71)	5,64 ± 1,06 (59)
Clearness system	5,92 ± ,64 (65)	6,20 ± ,52 (71)	5,81 ± ,97 (70)

a The highest score per item appears in bold

Overall are high scores given to the survey items, the lowest mean score is a 5.45 for visit in hospital 1. The scores of hospital 2 are overall higher than the scores of the other two hospitals. For a number of items a large group of the sample answered with 'not applicable', especially 'vegetarian choices', 'help eating', 'visit', and 'complaint handling' are not assessed. This makes sense, because only a small number of respondents is vegetarian or needed help with eating. Also a lot of respondents were not in need of eating together with family or relatives. Also the question about complaint handling was often answered with 'not applicable', because a large part of the sample did not had any experiences with complaints about the food service concept.

4.2.3 Comparison of perceived service quality survey items between hospitals

A Mann-Whitney U-test is conducted to compare the perceived service quality scores between the three hospitals. All 23 variables are listed in the table below, and the significant differences are shown. First hospital 1 (plated food service concept) is compared to hospital 2 (room service concept). Thereafter hospital 1 is compared to hospital 3 (small meals), and finally hospital 2 and 3 are compared to each other. The values show the differences in means between the two hospitals. Only the significant values are included in the table. These values show that there are differences in perceived service quality of the aspect between the two hospitals. A positive score means that the first mentioned hospital scores better, a negative score means that the second mentioned hospital scores better. The empty spaces

represent not significant differences, which means that patients in the two hospitals valued the items as the same.

Table 17: Comparison of perception scores of food service concept aspects between different hospitals

	H1 – H2	H1 – H3	H2 – H3
Food quality			
Taste			
Temperature	0,28 ^a		-0,22 ^{**}
Preparation	0,19 [*]		
Freshness			-0,31 [*]
Presentation			
Presentation		-0,15 [*]	-0,14 [*]
Portion sizes	-0,29 [*]		
Crockery and cutlery			
Choice			
Menu per day	-0,80 ^{***}		0,74 ^{***}
Healthy choices	-0,23 [*]		0,27 ^{**}
Vegetarian choices			0,20 [*]
Menu variation period			
Drinks			
Snacks		-0,32 ^{**}	
Service			
Explanation			
Help making choice			
Motivation			
Appearance			
Help eating			
Visit	-0,68 ^{***}	-0,64 ^{***}	
Complaint handling			
Autonomy			
Moments and frequency	-0,53 ^{***}	-0,25 [*]	0,28 ^{**}
Flexibility	-0,75 ^{***}		0,73 ^{***}
Clearness system	-0,28 ^{***}		0,39 ^{**}
Identified gaps	39,13%	17,39%	39,13%

a Values show significant differences on items according to the Mann-Whitney U-test. When a value is significant ($p \leq 0,05$), there is a difference in the perceived quality between the two hospitals concerned.

b Identified gaps calculated as the number of gaps found relative to the total number of sampled items (23).

Significant at ^{*} $p \leq 0,05$; ^{**} $p \leq 0,01$; ^{***} $p \leq 0,001$

Between hospital 1 and 2 9 out of 23 variables (39,13%) were statistically significantly different with respect to their perceived quality, with gaps ranging from 0,19 to 0,80. Hospital 2 had 7 higher evaluations than hospital 1. Between hospital 1 and 3 4 out of 23 variables (17,39%) were statistically significantly different, with gaps ranging from 0,15 to 0,64. In all 4 cases hospital 3 had higher evaluations. Between hospital 2 and 3 9 out of 23 variables (39,13%) were statistically significant differently evaluated, with gaps ranging from 0,14 to 0,74. In 6 out of 9 cases hospital 2 had higher evaluations.

The differences were mainly observed for temperature, presentation, menu per day, healthy choices, visit, and the aspects related to autonomy. The perceptions were mainly similar for the items related to service.

4.2.4 Importance of aspects

Respondents assessed in the questionnaire how important they found the main aspects of a food service concept as found in literature: food quality, presentation, choice, service, and autonomy. The results from all three hospitals together led to the following mean scores (on a scale from 1 to 7): food quality mean = 6,50, presentation mean = 5,62, choice mean = 5,88, service mean = 6,19, and autonomy mean = 4,72. This shows that the food quality is most important for the patients.

An ANOVA test is conducted to check if there are differences between the hospitals in which aspects patients value as important. A significant difference is found for one of the aspects, namely autonomy. A post-hoc test is done for the importance of autonomy to see where the scores differ. Because the sample sizes are slightly different per hospital, the Gabriel test is conducted. The importance of autonomy is significant different in hospital 2 from hospital 1 and 3. This means that autonomy is more important for patients in hospital 2 (mean = 5,77) than for patients in hospital 1 (mean = 4,25) and hospital 3 (mean = 4,10). SPSS results from this test are added in appendix 4. Patients in hospital 2, with the room service concept, have more autonomy than in the other hospitals because they can decide for themselves on what to eat, and when. Probably, because they are used to this comfort, they assign this aspect also as important. In the other two hospitals are times fixed, and choices limited. Patients in these hospitals found autonomy less important, probably because they are satisfied with the way of food provision as offered in the hospital wherein they stayed.

4.2.5 Patient satisfaction scores

At the end of the questionnaire patients gave a grade for the patient satisfaction on a scale from 1 to 10. These scores are as shown in table 18.

Table 18: Patient satisfaction scores

	Hospital 1	Hospital 2	Hospital 3
	Mean ± Std. Dev. (N)	Mean ± Std. Dev. (N)	Mean ± Std. Dev. (N)
Patient satisfaction	8,08 ± ,82 (65)	8,32 (71) ± ,81	8,13 (70) ±,98

The patient satisfaction scores are all three at the higher end, and not significantly different from each other. There are only little differences in the means, with hospital 2 (room service concept) having the highest score for patient satisfaction.

4.2.6 Factor analysis

A factor analysis with a Varimax (orthogonal) rotation of 23 items in the questionnaire was conducted on data gathered from the 206 respondents. The results are shown in table 19. The Varimax rotation is chosen to make the interpretation of factors easier, since it maximizes the sum of the variances of squared loadings. An examination of the Kaiser-Meyer Olkin measure of sampling adequacy suggested that the sample was factorable (KMO=,642), also Barlett's Test was significant ($p = ,000$). Seven factors have been extracted with an eigenvalue over Kaiser's criterion of 1. The total variance explained of the 7 factors is 64,45, which means that seven factors explain 64,6% of the variance of the original dataset. Cronbach's alpha is calculated to measure the reliability of the factors. Overall reliability was good, however the Cronbach's alfa of the third factor is rather low, so this variable may be inconsistent. Cronbach's alfa will be higher for factor 5 (.707 instead of ,641) if 'healthy choices' is deleted.

Table 19: Principal component analysis for 23 questionnaire items (loadings =>.5)

Factor	Cronbach's α	Item	Loading	VAF ^a cumulative %
Factor 1: Autonomy	,763	Moments and frequency	,795	24,28
		Flexibility	,728	
		Drinks	,578	
		Portion sizes	,550	
		Visit	,522	
Factor 2: Service	,807	Help eating	,873	33,61
		Complaint handling	,804	
		Temperature	,671	
Factor 3: Service and appearance of frontline employees	,570	Motivation	,722	41,52
		Appearance	,666	
		Explanation	,650	
Factor 4: Food quality	,737	Taste	,757	48,46

		Freshness	,715	
		Preparation	,569	
Factor 5: Menu variation	,641	Menu per day	,734	54,65
		Menu variation period	,646	
		Healthy choices	,644	
Factor 6: Presentation	,778	Presentation	,769	59,22
		Crockery and cutlery	,662	
Factor 7: Menu choices	,647	Menu variation period	,519	64,45
		Vegetarian choices	,795	
		Snacks	,619	

a VAF = Variance accounted for

Five items loaded onto factor 1. These items relate to aspects where patients have control over by their own, for example if they can decide on the moments to eat or portion sizes. This factor was labelled, 'Autonomy'. Three items loaded onto factor 2. These factors relate to the service, so if patients are helped by eating when required and the complaint handling. Temperature is a strange item in this factor, but it could be interpreted if food was served timely to assure a good temperature. This factor was labelled, 'Service'. Three factors loaded onto factor 3. These factors all relate to the service and appearance of the frontline employees provide and is therefore labelled, 'Service and appearance frontline employees'. Three items loaded onto factor 4, namely taste, freshness, and preparation. This factor is labelled, 'Food quality'. Also three factors loaded onto factor 5, these all correspond to the variation in the menu, and therefore this factor is labelled, 'Menu variation'. The two items that load onto factor 6 identify how the food is presented. This was labelled, 'Presentation'. Three items load onto factor 7, this factor is labelled 'Menu choices' because the items are related to the choices the patients have in the menu.

4.2.7 Regression analysis

A regression analysis is conducted to see if the factors have an influence on patient satisfaction. Data gained from all three hospitals are used in this analysis. The results are shown in table 20.

Table 20: Linear regression of three hospital together (n = 206) of perception of food service concept and contribution to patient satisfaction

Predictors	B	Std. Error	p
(Constant)	8,298	,136	,000***
1 Autonomy	1,012	,385	,014*
2 Service	-,692	,528	,202 ^{ns}
3 Service and appearance frontline employees	,700	,268	,015*
4 Food quality	,461	,146	,004**
5 Menu variation	,311	,203	,138 ^{ns}
6 Presentation	,573	,208	,010**
7 Menu choices	,455	,357	,214 ^{ns}
R²	,619	,608	,000***
Adjusted R²	,516	,608	,000***

Significant at *p≤0,05; **p≤0,01; ***p≤0,001;ns not significant

The regression model produced $F(7, 26) = 6,027$, $p < ,001$. The model is significant, and can be used to predict if the factors influence patient satisfaction with the food service concept. The adjusted R Square is ,516. This means that the factors explain for 51,6% of the variance of patient satisfaction. This means that 48,4% of the variance of patient satisfaction cannot be explained by aspects of the food service concept. From the table it can be seen that only the factors autonomy, service and appearance frontline employees, food quality, and presentation have a statistically significant contribution to patient satisfaction with the food service concept.

The B value is highest for the first factor. This means when the perceived quality of the first factors increases with one on the 7-point scale, the overall patient satisfaction score increases with 1,012.

The effects of the moderators as found in the literature study (age, gender, religion, type of household, education, length of stay, and perceived health status) were also checked, but no moderators had a significant influence on the relationship between the aspects of a food service concept and patient satisfaction.

4.2.8 Comments and suggestions

At the end of the questionnaire patients gave comments and suggestions. The most common comments and suggestions per hospital are given in the table. Only comments and suggestions with a frequency of two or more are included in the tables 21, 22, and 23 below.

Table 21: Comments and suggestions hospital 1

Comments / suggestions hospital 1	Frequency
Unaware of meals for visit	16
Dinner is too early	5
No soda/ other drinks	5
Food does not taste well	5
Too little explanation about assortment	3
No food and drinks after 8pm	3
Food is not cooked well	2
Time between breakfast and lunch too short	2
Often the same assortment	2

Table 22: Comments and suggestions hospital 2

Comments / suggestions hospital 2	Frequency
No drinks and food in the evening	11
Portion size	5
Food does not taste well	4
Food is bland	3
Not complete order delivered	3
Food is not hot enough	3
Food is not cooked well	3
Hard to compose a meal	3
Too excessive choice	3
Hutspot on the menu (strange in this season)	2
Suggestion to order salt, butter, sugar, etc.	2
No drinks on department (delivered by nurses)	2
45 minutes is too long to wait	2
Tosti and croquette are swampy	2

Table 23: Comments and suggestions hospital 3

Comments / suggestions hospital 3	Frequency
Dinner does not taste well	20
Too little portion sizes	10
Too few choices for dinner	7
Unaware of meals for visit	7
Food is not warm enough	6
Nutrition assistant does not show the options	6
Not known with food concept / no explanation	5
Too less fish on the menu	5
No menu card available with assortment	5
Often the same meals	4
Breakfast is too early	3
Very small portion salad in dinner	3
Nutrition assistant is not friendly / helpful	3
Bread is dry	2
Glasses with salads are inconvenient	2
Times are variable	2
Sauerkraut in June is strange	2

It can be seen in the tables above that some comments have a high frequency. In hospital 1 a lot of patients are unaware of the possibility that family or friends can eat together with them. Patients in hospital two mentioned 11 times that are missing the opportunity to order food and drinks in the evening, while the mean score for 'moments and frequency' was a 6,11. In hospital 3 was 20 times mentioned that the food did not taste well, this was especially about dinner and not about the breakfast, lunch, and in-between meals. This is not reflected in the results of the questionnaire, where hospital 3 scored a mean score of 5,82 for taste. Patient noticed also that the portion sizes were too small. The mean score for portion sizes in hospital 3 was a 5,77.

5. Conclusion and discussion

The objective of this study was to obtain insights in differences in patient satisfaction levels of different food service concepts. In this final chapter the analysed results of the empirical study are made conclusive. Paragraph 5.1 provides the conclusions of this study, and paragraph 5.2 represents the discussion.

5.1 Conclusion

This study showed an analysis of three different food service concepts, and differences are shown in perceived quality scores and patient satisfaction scores of these three food service concepts. The main research question of this research is 'Do, and if so to what extent, different food service concepts in hospitals result in different levels of patient satisfaction, and what explains for these differences?'

The patient satisfaction scores for the different food service concepts differ slightly, with a mean score of 8,08 for hospital 1 (plated food service), an 8,32 for hospital 2 (room service concept) and an 8,13 for hospital 3 (small meals). These differences are not statistically significant. Actually, the conclusion is that there are no differences found between patient satisfactions with the food service concepts. Conducting regression analyses per hospital to investigate what aspects contribute to the variance in patient satisfaction were not possible, and therefore it is not possible to answer the second part of the research question ('what explains for these differences?'). However, there are differences found between the patients' perceptions of the aspects of a food service concept measured in the questionnaire. The results show that hospital 2 has overall higher perception scores than hospital 1 and 3. The differences in perception scores correspond to the differences as expected from the analysis of three food service concepts. To illustrate, the employees in hospital 2 indicated that temperatures are not always optimal, and this aspect scored a bit lower. The perceived service quality of the aspects of a food service concept has, according to literature, an influence on patient satisfaction with the food service concept. We found a statistically significant relationship between the four factors autonomy, service and appearance frontline employees, food quality, and presentation and patient satisfaction with the food service concept, as visualised in figure 3. All three food service concepts were taken together in this analysis, to create an overall view on what factors influence patient satisfaction with the food service concept. Autonomy has the biggest effect on patient satisfaction with the food service concept. The factors explain for 51,6% of the variance of patient satisfaction with the food service concept. 48,4% cannot be explained by the aspects of a food service concept. The variables that explain this remaining percentage are unknown, since the moderators taken into account in the questionnaire show no significant effects on the relationship between the factors and patient satisfaction with the food service concept.

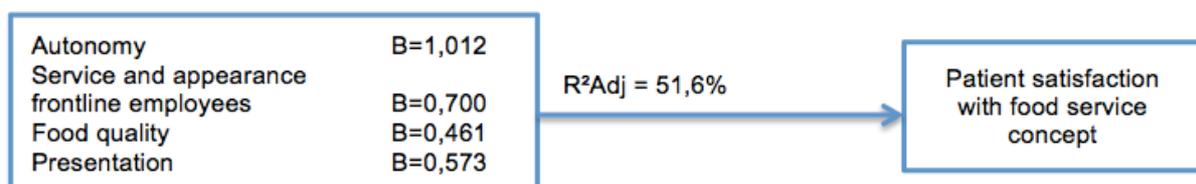


Figure 3: Influence of factors on patient satisfaction with food service concept

5.2 Discussion

In this research the literature study was conducted to gain insights in food service concepts and patient satisfaction. The information gathered in this literature study was translated into the questionnaire, interviews and observations, in a systematic way. The triangulation of methods, the inclusion of three hospitals with three different food service concepts, and the large amount of respondents from the same departments in all three hospitals ensured a good internal validity. However, the execution of food service concepts is very dependent per hospital, it is not possible to generalize the results for other food service concepts. For example, the room service concept of hospital 2 is adjusted to the facilities in the hospital, and therefore the results cannot completely be generalized to other room service concepts in

other hospitals. The external validity may be considered as limited. All questionnaires are distributed around the same time of the year in all three hospitals what led to comparative data. The patients judgements may vary from day to day, dependent on for example how they feel and in what mood they are. When questionnaires were distributed over a longer period, it was possible to make more conclusive statements about the food service concepts in it's total including all seasons.

It was not possible to completely answer the main research question, because no differences were found in patient satisfaction scores. Factor analyses and regression analyses per hospital led to no significant results, probably because the samples sizes were too small. Therefore it was not possible to indicate per hospital what contributed to patient satisfaction. It seems like it does not matter which food service concept you select because all patient satisfaction scores were nearly the same high scores, but this is not the case. There are differences found in the perception scores with the different aspects of a food service concept. Based on these scores, and the features of a certain food service concept, a hospital can choose a food service concept that meets their goals. If a hospital has the aim to empower patients, like in hospital 2, then probably a room service concept is more appropriate than a pre-plated food service concept. It was also found that besides patient satisfaction, the features of a food service concept also influence for example the nutritional intake or costs (Mahoney et al., 2009; Freil et al., 2006). These factors must also be taken into account in selecting a food service concept, but are not identified in this study.

The perceived service quality scores for the aspects of a food service concept and the patient satisfaction scores where all rather high. Almost no patients gave unsatisfactory grades, while some of them gave a lot of comments and recommendations about possible improvements. The mildness of people with filling in the questionnaires led to the fact that not all critical notes came forward in the perception and patient satisfaction scores. Explanations for this, could be regarding to Avis, Bond, and Arthur (1997) social desirability bias, reluctance to express a negative opinion, and the wording of questions. General terms in the questionnaire are clarified by giving examples. Another explanation for the high rates could be the fact that the researcher took the questionnaires personally, which also led to social desirable bias, because some patients were not sure about the role of the researcher. It was also assumed in the literature that most of the consumers have a negative attitude towards hospital meals, which was called 'institutional stereotyping'. In this study it could also be the case that patients had lower expectations of the food service concept, but the perceptions where high, causing a higher patient satisfaction score (Cardello, Bell, & Kramer, 1995).

The results of the literature study do not completely correspond to the results of the empirical study with regard to the analysis of the food service concepts. Not all characteristics found of food service concepts in the literature study correspond to the characteristics found in the interviews and observations. The food service concept of hospital 1 can be compared to the results of the literature for a plated food service concept. The literature suggested poor temperature and bad textures of food for example, while in the analysis of the pre-plated food service concept in hospital 1 it was found that food quality, temperature and preparation are good because of the fresh preparation. The literature suggested also a minimal person-to-person interaction in a pre-plated food service, but in hospital 1 there was often interaction between the nutrition assistants and patients. The food service concept of hospital 2 can be compared to the room service concept as described in the literature study. Differences were found in the food quality. The literature suggests a good food quality and temperature, while the empirical study showed that temperature and taste are not always best. Probably because the studies found in literature are also based on one case, and therefore not completely generalizable to other hospitals. It is also questionable if all answers from the interviews are objective, since the interviewees were informed about the goals of the research, and probably concealed weaknesses of the food service concept. This effect was minimised by conducting interviews on different levels and doing observations afterwards.

The results of the questionnaire correspond to expectations based on the results of the analysis of food service concepts. Perception scores that where somewhat lower were also expected from the analysis.

For example, hospital 2 has a very extended menu card compared to hospital 1 and 3, and scores higher on almost all aspects related to choice. This applies also for autonomy, it was found that hospital 2 gives patients more dependence and control and this is evident from the questionnaire results.

The factors autonomy, service and appearance frontline employees, food quality, and presentation have an influence on the patient satisfaction with food service concepts. The motivation-hygiene theory of Herzberg, Mausner, and Snyderman (1959) can be applied on this. Factors that have a significant influence on patient satisfaction with the food service concept can be seen as motivators. These factors have a direct influence on patient satisfaction. The other factors, which did not lead to significant influences, are hygiene factors. Service, menu variation, and menu choices are not of importance for patient satisfaction when they are executed in the right way. But if they are not performed well they will detract from patient satisfaction. The hygiene factors are basic conditions for patients; they assume that these aspects are present in a hospital (Herzberg, 1959). Only 51,6% of the factors explains for the variance in patient satisfaction with the food service concept. The other 48,4% must be explained by other factors. It was assumed that the variance explained should be higher, because the questionnaire asked for patient satisfaction with the food service concept, and the perceptions with the aspects of a food service concept explain only 51,6% of the variance. An explanation for this could be that there are also a lot of other factors that explain patient satisfaction with the food service concept, not necessarily related to the food service concept itself. Naidu (2009) mentioned that socio-demographic characteristics could influence patient perceptions. These are taken into account in this study, but did not have a significant impact. Other variables that may influence patient satisfaction with the food service concept indirectly are among others the communication with physicians, staff friendliness, the way in which diagnosis, treatment and care were explained, healthcare costs, waiting times, the physical condition of the hospital, and the amount of information provided (Naidu, 2009).

In the questionnaire are moderating variables taken into account, namely the age, gender, type of household, religion, educational level, dietary restrictions, length of stay, perceived health status, experience of stay, and the patient room. All these moderators were not found as having significant influences on the relationship between the perceived service quality with the aspects of a food service concepts and patient satisfaction with the food service concept while the theory declared possible influences. A reason for this could be the way in how they are measured in the questionnaire. The physical environment is in this study taken as a moderating variable, while Bitner (1992) suggested a direct relationship between the physical environment and satisfaction. In the questionnaire was one question asked 'How do you value the patient room (devices, acoustics, lightning, temperature) wherein you stay?' to measure the perceived physical environment. Probably, the physical environment should be seen as part of the food service concept to explain a larger part of the relationship between the food service concept perceptions and patient satisfaction with the food service concept. Another solution could be to measure the physical environment more extensive by dividing the question into different sub-questions related to the environment to gain deeper insights in how patients evaluate the physical environment. Also other moderating variables, which were not taken into account in the questionnaire, could have an influence on how patients assess the food service concept, for example the type of disease, the exact medical conditions, if patients were waiting for test results or just received bad news. It was assumed that the length of stay of patients should influence the relationship between the aspects of a food service concept and patient satisfaction, because the longer the patients stayed, the more monotone the choices would be. Also for this moderator there was no significant effect found. Probably were the answer categories not thoughtfully chosen, because the longest possibility to fill in for patients was more than five days. A number of patients participating in the survey stayed for a few weeks, so this is not apparent from the results.

Patients gave a rating for how important they found the main aspects in the survey. No significant differences were found for food quality, presentation, choice, and service. Scores for these aspects were rather high, indicating that all these aspects are important for patients. A significant difference was found for autonomy. It was noticed that what patients were used to often also rated as important, for example in hospital 2 patients were used to eat when and what they wanted, and rated autonomy as

important. In the other hospitals patients were used to fixed times, smaller menu choices and dependency of nutrition assistants, and rated autonomy as less important. An explanation for this could be that patients in hospital 1 and 3 are not known with a room service concept, and find it unusual in a hospital to decide on their own eating moments. This could be a reason that patients in these hospitals attach lower values to autonomy than patients in hospital 2.

6. Recommendations

The literature study and the empirical study revealed recommendations for hospitals as well as for further research within the field of food service concepts. First the recommendations for hospitals are presented in paragraph 6.1, and in paragraph 6.2 are the recommendations for further research given.

6.1 Managerial implications

In the empirical study it is found that autonomy, the service and appearance of frontline employees, food quality, and presentation have an influence on the patient satisfaction with the food service concept. Therefore it is of importance for food and facility managers to focus on these elements because these are 'motivators' for patients. Also the other factors, service, menu variation, and menu choices are of importance to avoid dissatisfaction, but they do not provide satisfaction by themselves. There are differences found in how the three different food service concepts were assessed on the various aspects of a food service concept. When selecting a food service concept, managers have to define what they want to achieve with the food service concept, and can use the perception scores to see what concept fits best to these goals. Of course, also other aspects that are not taken into account in this study, like the costs, waste, or nutritional intake, should be taken into account when selecting a food service concept.

Recommendations for hospital 1 (plated food service)

The main goal of hospital 1 was to provide a hospitable system that meets patients' requirements in relation to food. No remarkable results were found in the perception scores for the food service concept of hospital 1. All mean scores are between 5,45 and 6,20. 5,45 is the mean score for 'visit', and 6,20 is the mean score for 'appearance'. The lower score for 'visit' is also reflected in the comments and suggestions that patients gave at the end of the questionnaire. 16 patients commended that they were unaware of the fact that visitors could consume a meal together with them. Another comment, related to this subject is that patients received too little explanation about the assortment. A recommendation for hospital 1 is therefore to pay more attention to the explanation of the food service concept at the intake of new patients. This relates also to the main goal of the food service concept, namely to the hospitality of the frontline employees. Hospital 1 can make improvements in providing a hospitable system by focusing on the hospitality of the frontline employees. Other comments from patients related to the timing of food provision, a few patients found dinner too early, others found the time between breakfast and lunch too short, and a few patients missed food and drinks after 8pm. Therefore, the second recommendations for hospital 1 is to take a look at the moments of food provision to see if these can be changed or more flexible to meet patients' wants.

Recommendations for hospital 2 (room service concept)

The main goal of hospital 2 for the food service concept was to give patients control on what to eat and when. The mean perception scores for hospital varied from 5,63 (freshness) to 6,55 (menu per day). The lowest scores were for food quality, which also appears from the comments and suggestions. Patients mentioned that the food did not taste well, was bland, was not hot enough, or was not good prepared. A recommendation for hospital 2 is to focus on food quality by improving the temperature of food and the preparation and taste. Patients gave the highest score for the menu per day, but some patients mentioned that the choice was too excessive. Others, especially elderly, found it hard to compose a meal from all the separate components and to pay attention to not forget additions like salt, sugar or butter. Therefore, the second recommendation for hospital 2 is to provide some already completed menu options that are easy to choose for elderly. Hospital 2 meets the main goal of the food service concept, since patients have indeed the control on what to eat and when.

Recommendations for hospital 3 (small meals 7 times a day)

Hospital 3 focuses on tasty food that contributes to the wellbeing and recovery of patients. The mean perception scores for hospital 3 lie between 5,60 (explanation) and 6,21 (snacks). The lower score for explanation becomes also clear from the comments. Patients mentioned that they were not known with the intentions of the food service concepts, that the menu was not clear, and that they were not aware of the option to eat with visitors. Also a lot of patients mentioned that the portion sizes were too little. Often these patients did not know that they were allowed to take more than one portion, because this was not mentioned by the nutrition assistant. The first recommendation for hospital 3 is to pay more attention to the explanation of the food service concept to new patients. Another comment with a high frequency (20x) is that the dinner does not taste well. The second recommendation for hospital 3 is to improve the taste of the dinner.

6.2 Recommendations for further research

Further research is needed to explain what else, besides the aspects of a food service concept, explains for the variation in patient satisfaction with the food service concept. Research could be conducted about the moderators and their influences, and the influence of the physical environment. Further research could also reflect on the questionnaire, to see where it could be improved to make it more comprehensive. To give an overall insight in patient satisfaction per hospital further research could be done at other departments that are not taken into account in this research, for example the paediatric ward and the maternity ward to take also the younger age groups into account. The regression analyses per hospital to show which aspects of the food service concept explain for the variance of the patient satisfaction with the food service concept led to no significant results. Probably by including more patients in the sample per hospital significant results could be found. The results are not generalizable to other hospitals because this study assessed particular cases. To make more general results, more hospitals should be included with the same types of food service concepts.

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Appendix 1: Questionnaire

Vragenlijst voedingsconcept

Voor mijn afstudeeronderzoek naar voedingsconcepten in ziekenhuizen ben ik benieuwd naar uw mening over de maaltijdvoorziening in dit ziekenhuis.

- De vragenlijst is anoniem.
- Het invullen van de vragenlijst zal ongeveer 5 à 10 minuten duren.
- De vragenlijst begint met een aantal algemene vragen.
- Hierna mag u de verschillende aspecten van het voedingsconcept beoordelen.
- Aan het einde van de vragenlijst kunt u uw opmerkingen of suggesties kwijt.

Instructies:

- Lees de vragen zorgvuldig door en denk rustig na over het antwoord.
- Beantwoord alle vragen, het is van belang dat u geen vragen overslaat.
- Raadpleeg bij twijfel de onderzoekster, zij kan u helpen.
- Per onderdeel zijn er stellingen geformuleerd, kies het antwoord wat bij u van toepassing is.
- Geef eerlijk uw mening, u mag hierin best wel kritisch zijn.
- Foute antwoorden bestaan niet.

Alvast hartelijk bedankt voor uw medewerking!

Algemene gegevens

Wat is uw geslacht?

- Man
- Vrouw

Wat is uw leeftijd?

.... jaar

Wat is uw woonsituatie?

- Alleen wonend
- Samenwonend met partner
- Samenwonend met partner en kind(eren)
- Samenwonend met kind(eren)
- Anders

Wat is uw geloofsovertuiging?

- Christendom
- Jodendom
- Islam
- Geen
- Anders

Wat is uw hoogst voltooide opleidingsniveau?

- Geen opleiding
- Basisonderwijs
- Lager beroepsonderwijs
- Middelbaar beroepsonderwijs
- Hoger beroepsonderwijs
- WO

Gelden er voedingsbeperkingen voor u, en zo ja welke?

- Nee, er gelden geen voedingsbeperkingen voor mij
- Natrium
- Gluten
- Lactose
- Diabetes
- Gemalen/ vloeibaar
- Vegetarisch
- Veganistisch
- Halal
- Koosjer
- Anders

Hoeveel dagen verblijft u momenteel in dit ziekenhuis?

- 1 dag
- 2 dagen
- 3 dagen
- 4 dagen
- 5 dagen
- > 5 dagen

Hoe voelt u zich op dit moment?

- Slecht
- Matig
- Redelijk
- Goed
- Zeer goed

Hoe ervaart u het verblijf in het ziekenhuis in het algemeen?

- Slecht
- Matig
- Redelijk
- Goed
- Zeer goed

Hoe beoordeelt u de patiëntenkamer (o.a. de inrichting, akoestiek, temperatuur, verlichting) waarin u verblijft?

- Slecht
- Matig
- Redelijk
- Goed
- Zeer goed

Kwaliteit

Hoe beoordeelt u de volgende aspecten met betrekking tot de kwaliteit van het eten en drinken?

	Ze er sle cht	Sle cht	Mat ig	Bij na vol doen de	Vol doen de	Go ed	Ze er go ed	n.v.t.
1. De smaak van het eten	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. De temperatuur van het eten	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. De bereiding van het eten (bijv. gaarheid, textuur)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. De versheid van het eten (bijv. krokantheid, malsheid, frisse geur)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

In hoeverre vindt u de kwaliteit van het eten en drinken belangrijk?

Ze er on be lan gri jk	On be lan gri jk	En ig sz ins on be lan gri jk	On be lan gri jk no ch be lan gri jk	En ig sz ins be lan gri jk	Be lan gri jk	Ze er be lan gri jk	n.v.t.
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Presentatie

Hoe beoordeelt u de volgende aspecten met betrekking tot de presentatie van het eten en drinken?

	Ze er sle cht	Sle cht	Mat ig	Bij na vol doen de	Vol doen de	Go ed	Ze er go ed	n.v.t.
5. De presentatie van het eten (bijv. de kleur van het eten, de presentatie op/in het servies)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. De portiegroottes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Het servies en bestek	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

In hoeverre vindt u de presentatie van het eten en drinken belangrijk?

Ze er on be lan gri jk	On be lan gri jk	En ig sz ins on be lan gri jk	On be lan gri jk no ch be lan gri jk	En ig sz ins be lan gri jk	Be lan gri jk	Ze er be lan gri jk	n.v.t.
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Keuzemogelijkheden

Hoe beoordeelt u de volgende aspecten met betrekking tot de keuze voor eten en drinken?

	Ze er sle cht	Sle cht	Mat ig	Bij na vol doen de	Vol doen de	Go ed	Ze er go ed	n.v.t.
8. Het menu aanbod per dag	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. De mogelijkheid om een verantwoorde voedingskeuze te maken (<i>bijv. geschikt voor dieet, gezonde voeding, vetbeperkt</i>)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Het aanbod van vegetarische gerechten	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. De menuvariatie over een periode langer dan 1 dag	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Het aanbod van dranken (<i>bijv. variatie</i>)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Het aanbod van tussendoortjes (<i>bijv. variatie</i>)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

In hoeverre vindt u het aanbod van eten en drinken belangrijk?

Ze er on belan grij k	On belan grij k	En igsz ins on belan grij k	On belan grij k no ch belan grij k	En igsz ins belan grij k	Belan grij k	Ze er belan grij k	n.v.t.
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Service

Hoe beoordeelt u de volgende aspecten met betrekking tot de service?

	Ze er sle cht	Sle cht	Mat ig	Bij na vol doen de	Vol doen de	Go ed	Ze er go ed	n.v.t.
14. Uitleg over het voedingsconcept (<i>bijv. informatie over aanbod, eetmomenten, diëten</i>)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. De hulp bij het maken van een voedingskeuze	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. De motivatie/aanmoediging door de medewerkers om te eten (<i>bijv. in hoeverre stimuleren zij u om te eten?</i>)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. Het voorkomen van het personeel (<i>bijv. verzorgdheid, netheid</i>)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. De hulp bij het eten (<i>bijv. smeren van brood, snijden van eten</i>)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. De mogelijkheid om bezoek mee te laten eten	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. De omgang met klachten of opmerkingen over voeding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

In hoeverre vindt u de service belangrijk?

Zeer onbelangrijk	Onbelangrijk	Enigszins onbelangrijk	Onbelangrijk noch belangrijk	Enigszins belangrijk	Belangrijk	Zeer belangrijk	n.v.t.
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Autonomie

Hoe beoordeelt u de volgende aspecten met betrekking tot autonomie (uw zelfstandigheid en onafhankelijkheid van anderen)?

	Zeer slecht	Slecht	Matig	Bijna voldoende	Voldoende	Goed	Zeer goed	n.v.t.
21. De momenten waarop eten en drinken aangeboden wordt (bijv. <i>tijdstippen, frequentie</i>)	<input type="radio"/>							
22. De flexibiliteit van het voedingsconcept (bijv. <i>mogelijkheid om af te wijken van eten en drinkmomenten</i>)	<input type="radio"/>							
23. De manier waarop eten en drinken besteld kan worden (bijv. <i>duidelijkheid van het bestelsysteem</i>)	<input type="radio"/>							

In hoeverre vindt u autonomie belangrijk?

Zeer onbelangrijk	Onbelangrijk	Enigszins onbelangrijk	Onbelangrijk noch belangrijk	Enigszins belangrijk	Belangrijk	Zeer belangrijk	n.v.t.
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Algemene beoordeling

Welk rapportcijfer geeft u het voedingsconcept in zijn totaliteit?

1	2	3	4	5	6	7	8	9	10
<input type="radio"/>									

Opmerkingen

Indien u nog opmerkingen of suggesties heeft kunt u die hier aangeven.

.....

.....

Dit is het einde van de enquête. Hartelijk bedankt voor uw medewerking!

Appendix 2: Description food service concepts from interviews

Table A: Analysis of interview

Aspect	Ziekenhuis 1	Ziekenhuis 2	Ziekenhuis 3
Type voedingsconcept	Broodserveerwagen voor ontbijt en lunch. Gekoppelde keuken voor de warme maaltijd. Alles in eigen beheer.	Room service concept. Concept van een externe leverancier, personeel in eigen beheer.	6 à 7 keer per dag kleine hapjes. Concept en personeel zijn beide uitbesteed.
Rol geïnterviewden	Sector manager eten, drinken en gastvrijheid: verantwoordelijk voor alles wat met eten en drinken te maken heeft in het ziekenhuis (1). Voedingsassistent: verantwoordelijk voor de verstrekking van maaltijden op de afdeling (2).	Hoofd hoteldienst: verantwoordelijk voor voeding in het ziekenhuis (1). Teamleider externe leverancier: verantwoordelijk vanuit de externe leverancier van het concept (2). Zorg-assistent: zorg, voeding, neventaken zoals bijvullen van afdelingsvoorraden (3). Maaltijdservice medewerker: telefonisch beantwoorden van de bestellingen van de patiënt (4).	Project manager: verantwoordelijk voor de uitrol en verbeteren van het concept in het ziekenhuis (1). Operationeel manager: verantwoordelijk vanuit de externe leverancier (2). Voedingsassistent: verantwoordelijk voor de verstrekking van de maaltijden op de afdeling (3).
Doelen van het voedingsconcept	In plaats van backoffice gestuurd werken met de voedingsadministratie, werken met voedingsassistenten die ter plekke keuzes kunnen maken met de gast aangepast op voedingsafleidingen (1). Hoofddoelen: Dat het zoveel mogelijk aansluit bij de behoefte van de patiënt, bijvoorbeeld met relatie tot hun ziektebeeld of om zo goed mogelijk te eten om zo snel mogelijk weer naar huis te gaan (1). We letten ook nadrukkelijk op de 20% die een streng dieet hebben, deze mensen moet je ook een goede maaltijd kunnen geven (1). De doelen zijn om patiënten optimaal te voeden, en ook om gastvrij te zijn (2).	We willen de regie bij de patiënt leggen (1). Het is een gastvrijheidsconcept waarin de patiënt de regie heeft. Patiënten kunnen zelf bepalen wat ze weten, waar en met wie (2). Gastvrijheid, zelf bepalen wanneer je eet en een groot aanbod bieden (3). Dat mensen ter plekke kunnen nemen wat ze willen (4).	Lekker eten en drinken dat bijdraagt aan het welbevinden en het herstel aantoonbaar bevordert (1). Ambachtelijk koken, gastvrijheid en differentiatie naar patiëntgroepen (2). Ondervoeding tegen gaan, en zorgen dat patiënten tevreden zijn met wat ze zien en krijgen (3).
Waarom past het binnen dit type ziekenhuis?	Het systeem zou in elk ziekenhuis zijn plek kunnen vinden, maar hier past het goed omdat wij een centrale keuken hebben. Een ander	We hebben voeding als speerpunt, en willen graag iets innovatiefs (1). Voeding en bewegen is het motto van het ziekenhuis, dit systeem past	Er is volume nodig om het concept rendabel te maken, streekziekenhuizen hebben een te klein volume (1). Dit is een innovatief ziekenhuis, en er

	<p>systeem zou hier niet passen omdat wij op de afdelingen geen maaltijden kunnen bereiden (1). Dit concept past wel bij de gastvrijheid die we willen uitstralen, het is net zoals thuis je bedenkt aan het begin van de dag wat je 's avonds wilt eten (2).</p>	<p>hier perfect in (2). Dit ziekenhuis doet zich voor als voedingsziekenhuis, en er worden ook vaak nieuwe dingen geprobeerd (3). We zijn heel bewust bezig met eten en dingen uitproberen (4).</p>	<p>is lef om over te gaan naar dit voedingsconcept. Dit tref je eerder aan in een academisch ziekenhuis dan ergens anders (2).</p>
<p>Food quality <i>(Temperature, texture, flavour)</i></p>	<p>De tijd tussen bereiden en eten is kort. De bandkaarten worden om 4 uur gedrukt, dan worden maaltijden voor de externe partners gemaakt, en vervolgens de maaltijden voor onze kliniek. Om half 5 zijn de eerste maaltijden klaar, en deze zijn om kwart voor 5 op de eerste afdeling (1). Door de gekoppelde keuken zijn de temperatuur en textuur van de maaltijden goed (1). De temperatuur is goed, die meten we ook 1 keer per week (2). Het eten smaakt lekker, vooral het menu van de chef. Dit komt ook doordat we gekoppeld koken en niet hoeven te regenereren (2).</p>	<p>We hebben een a la carte systeem met 20 minuten bereidingstijd. Daarna worden de koude componenten toegevoegd op een assemblage lijn, en vervolgens in een karretje gedaan en verspreid over de afdelingen. Dit duurt in totaal 45 minuten (1). Het karretje is een serveerwagentje zonder techniek, het warmte effect komt doordat we borden gebruiken die nawarmen (1). De temperatuur is het grootste aandachtspunt, en dat komt omdat de maaltijd soms wel drie kwartier onderweg is (2). De temperatuur checken we steekproefsgewijs. (2). De temperatuur is vaak te koud (2+4). Groenten en aardappels worden zoutloos gekookt (1). Patiënten kunnen zelf smaakmakers bij hun maaltijd bestellen (1). De smaak van het eten is goed, alles wordt vers bereid. De temperatuur is niet altijd goed, soms is het eten lauw (1). Mensen vinden het eten soms flauw (3). De smaak en textuur worden ook getest door verschillende mensen (2). We gebruiken zo min mogelijk zout, maar koken wel smaakvol (2). We gebruiken 75 tot 80% verse ingrediënten (2). De gemiddelde leeftijd is hoog, dus groenten koken we gaarder (2). Groenten en aardappels zijn vaak te hard voor ouderen (3+4).</p>	<p>Snacks worden af en toe lauw geserveerd (1). De smaak en textuur zijn goed (1). De smaak van het eten is goed omdat het van een kwaliteitscateraar komt (2). De maaltijden worden bereid bij de leverancier, en hier afgemaakt en opgewarmd (1). De temperatuur van het eten is goed (3). Het eten smaakt goed, maar soms is het flauw maar je kan niet te veel kruiden gebruiken in een ziekenhuis (3).</p>
<p>Presentation <i>(Colour, portion size and volume, crockery and cutlery)</i></p>	<p>We geven veel aandacht aan de presentatie, daarom zijn we ook met de pannetjes gaan werken. We proberen ook zoveel mogelijk te variëren met kleuren binnen een maaltijd (1). Ook voor de vloeibare gerechten zorgen we ervoor dat ze smakelijk uit zien (1). De warme maaltijden worden in pannetjes geserveerd, en de toetjes in glaasjes. De salades worden in porseleinen bakjes gedaan (2). De patiënt kan kiezen uit een kleine portie of een normale portie. Goede eters, bijvoorbeeld patiënten met een</p>	<p>Patiënten kunnen kiezen uit een halve, hele of anderhalve portie (1+2). Er wordt gevarieerd met verschillende kleuren in een maaltijd (3). Oudere mensen vinden het fijn dat ze kleinere porties kunnen kiezen, dat is overzichtelijk en zo zijn ze voldaan als ze een hele maaltijd op hebben (3).</p>	<p>Alles wordt geserveerd in porselein, glaswerk en met echt bestek. En alles ziet er smaakvol en mooi uit (1). We serveren de gerechten in kleine pannetjes, en glaasjes. Er wordt echt nagedacht over hoe het eruit moet zien. We gebruiken verschillende placemats en het ontbijt ziet er leuk uit (2). Het eten wordt mooi geserveerd in glas en porselein (3). Mensen denken vaak dat de porties te klein zijn maar hier komen ze achteraf op terug (3).</p>

	gebroken been, kunnen kiezen voor een dubbelgrote portie (2).		
Choice <i>(Within-meal variety, across-meal variety, dietary variety)</i>	<p>We werken met een twee weken basiscyclus waar we gerechten in en uit schuiven aangepast aan het seizoen en de temperatuur (1). Patiënten kunnen uit de broodserverwagens kiezen voor ontbijt en lunch, met dagelijks een wisselende soep tijdens de lunch (1). Ik denk wel als mensen langer liggen dat ze vanuit hun persoonlijke voorkeur wel wat gerechten terug zien komen. Als mensen langer liggen kunnen we onze menucyclus hier niet op aanpassen, maar we hopen dat deze mensen dat ons laten weten zodat we af kunnen stemmen wat we los van de cyclus kunnen betekenen (1). Er zit genoeg variatie in het menu, maar als mensen lang liggen dan kan het lijken alsof het vaak hetzelfde is (2). Er wordt gewerkt met seizoensproducten en streekproducten (2). We hebben een menu van de chef, en keuze uit verschillende componenten (2). Wij rijden als het mogelijk is met de broodserverwagens de kamer op zodat patiënten ook echt kunnen zien wat er is (2).</p>	<p>De algemene menukaart draaien we 365 dagen per jaar. Daarnaast hebben we een dagmenucyclus met seizoensgerechten en we hebben een kinderkaart. Voor diëten hebben we aparte kaarten of inlegvellen. Er worden ook vaak nieuwe dingen aangeboden, bijvoorbeeld quinoa, smoothies of eten met insecten erin (3). Als mensen heel erg lang liggen dan is de variatie wel eens uitgeput (3). De seizoensmaaltijden zouden van mij meer gewisseld mogen worden, die duurt lang (3). Patiënten moeten de maaltijd helemaal zelf samenstellen, dus alle componenten en sauzen apart bestellen. Ook de suiker, zout, margarine, etc. (4).</p>	<p>Er zijn 7 rondes per dag met meerdere keuzen per ronde (1). Ontbijt ronde, half 10 shakes ronde, daarna drankenronde, half 12 lunchronde, half 3 snacks ronde en dranken, rond 4 uur keuze voor avondeten opnemen, avondmaaltijd, avondronde (3). Dranken worden apart geserveerd met de broodbuffetwagens (1). Ontbijt wordt ook geserveerd vanuit de broodbuffetwagens, elke dag andere extra's erbij (3). We hebben een dieetdesk, met daarin gerechten voor verschillende diëten (1). Er is een 14 daagse cyclus. Gerechten mogen twee dagen geserveerd worden (1+2). In de seizoenen voegen we weer nieuwe gerechten toe aan de kaart (2). In de winter heb je stampotten, in de zomer salades (1+3).</p>
Service <i>(Appearance, attitude)</i>	<p>Op gebied van service kunnen we nog wel een aantal dingen verbeteren, bijvoorbeeld duidelijk maken dat patiënten het menu op de bedside terminal kunnen zien (1). Wij leggen uit aan de patiënt, althans dat is de bedoeling, wat er in ons assortiment zit (2). De verschillen tussen voedingsassistenten zijn nog best wel groot, we doen een gastvrijheidsproject om iedereen op een lijn te krijgen (1). Waar nodig geven we hulp aan de patiënt, bijvoorbeeld brood smeren (2). Je kunt heel gastvrij zijn door patiënten af en toe iets anders aan te bieden, bijvoorbeeld extra vegetarische keuzes of een keer een pannenkoek of frietje (2). We zitten in een gastvrijheidsstraject en daarin wordt ingespeeld op wat gastvrijheid is en wat je kunt betekenen voor de patiënt (2). Als een patiënt zegt dat ie niets hoeft kun je weglopen, maar je kunt er ook voor zorgen dat ie toch nog iets neemt. Dat is het doel van het vak (2). Patiënten kunnen altijd hun</p>	<p>Gasten kunnen tegen betaling mee eten met de patiënten, en kunnen dan kiezen van de hele menukaart (1). De maaltijd moet wel op een bord passen (1). De maaltijdservice medewerker geeft adviezen aan de patiënt over welke voeding geschikt is, daarom hebben we gekozen voor een persoonlijke benadering met bestellen in plaats van met een tablet (2). De medewerkers hebben een adviserende rol, wat de patiënt wil eten beslist ie uiteindelijk zelf (2). De zorg-assistent bestelt de maaltijden voor mensen die dat niet zelf kunnen (2). De roomservice medewerker mag alleen de maaltijd bezorgen, verder niet helpen (2+3). De zorg-assistent heeft voornamelijk zorgtaken, en helpt met eten en drinken (2). Onze afdeling heeft nog een koffieronde, dit betekent dat wij een aantal keren per dag langs gaan met koffie. Dat hebben niet alle afdelingen (3). Wij zijn gastvrouw en moeten het concept duidelijk uitleggen aan de patiënt (3).</p>	<p>Op gebied van service zijn er nog verbeterpunten mogelijk (1). Voedingsassistenten krijgen trainingen over gastvrijheid, kennis en bijvoorbeeld voedselveiligheid (1). Gasten kunnen mee eten met de patiënt. Als ze de maaltijd te klein vinden dan krijgen ze er twee (1). De uitleg van het concept is nu niet altijd goed (2). Medewerkers werken hier nu al soms 30 jaar en vinden het lastig om te veranderen, daar krijgen ze trainingen voor (2).</p>

	partner mee laten eten, op de kamer of beneden in het restaurant. Zij betalen hier dan een vergoeding voor (2).	Iedereen is netjes gekleed hier (3). Het is erg lastig om de kamers schoon te houden omdat er continue nieuwe dienbladen aangeleverd worden (3).	
Autonomy (Flexibility, understandable and accessible system)	De tijden voor de maaltijdverstrekking staan vast, maar als iemand liever 's middags warm eet dan is dit mogelijk (1). Voedingsassistenten komen vijf keer langs met de broodserveerwagen en een keer met de warme maaltijd, als het nodig is vaker (1). Het aantal contactmomenten is vaker, want ze komen ook langs met de tablet om de menukeuze op te nemen, en om lege bladen af te halen (1). Als een patiënt afwezig is dan komen wij of de verpleging later terug om bijvoorbeeld een drankje op te nemen (2). We hebben het ontbijt, dan de drankenronde om 10 uur, tegen 12 de lunch, dranken om kwart voor 3, de warme maaltijd om 5 uur, en nog een avond drankenronde (2). Af en toe is er een klacht dat we te vroeg starten (2). Als mensen honger hebben tijdens de drankenronde kunnen ze ook nog iets uit de broodserveerwagen kiezen (2). Mensen kunnen hier niet eten en drinken wanneer ze willen omdat wij vinden dat het zorgproces leidend is, en daar de faciliteiten op af moeten stemmen (1). Het bestelsysteem is duidelijk voor de patiënten. Ze kunnen van de broodserveerwagen kiezen wat ze willen en ook voor de warme maaltijd, dit gaat allemaal in samenspraak met de voedingsassistenten (1). De meeste mensen eten op hun kamer, en je ziet dit alleen maar meer worden omdat je steeds slechter in een ziekenhuis komt (1). Het assortiment is zichtbaar in de bedside terminal, maar je hebt altijd mensen die de uitleg missen of ouderen die dat niet snappen (2).	Patiënten kunnen van 7 uur tot kwart over 6 bestellen hoe vaak dat ze willen, met een max van 12 keer. Maaltijden kunnen tot 7 uur uitgeserveerd worden (1). De bestelmethode wordt altijd uitgelegd door de zorg-assistent tijdens de opname (1). Er is een systeem van nabellen, als patiënten nog niet besteld hebben dan wordt de verpleging gebeld om de patiënt te waarschuwen dat hij moet eten (3). Voor sommige mensen is het een drempel om te bellen, dan helpen wij (3). Soms wordt er wel misbruik gemaakt van het systeem, dat ze extra veel bestellen voor de bezoekers (2+4). Er wordt nog wel vooral op de normale tijdstippen besteld (4).	Patiënten kiezen op het moment zelf wat ze willen eten, uit een keuze van 3 tot 4 gerechtjes (1). Patiënten zien niet van te voren wat de keuzes zijn, tenzij ze hiernaar vragen (1). Als patiënten de keuzes echt niet lusten dan kunnen ze nog altijd brood krijgen (1). Het is de bedoeling dat patiënten verleid worden door het eten wat aangeboden wordt, maar als ze echt iets anders willen dan kan dat (2).

Appendix 3: Observation forms

Hospital 1

Date: 02-05-2016

Table B: Observation form hospital 1

Aspect	Observations	Comments
Preparation of food	Food is mainly fresh prepared in the central kitchen. A small part of the ingredients is ready made. Meals are distributed on plates at the assembly line, and directly served to patients via a hot container. Breakfast and lunch are served from the buffet trolley car. Nutrition assistants fill the car in the pantries at the wards.	Walk-through with food manager.
Presentation - Colour of food - Portion size and volume - Crockery and cutlery	Food is served on porcelain plates. Desserts are served in small glasses. Drinks are served in glasses and mugs. Patients can decide on their own portion sizes.	Observation on wards
The menu	Daily menu of the chef, and choices from different components. There is also the opportunity to eat in the restaurant, then you have to choose a one pan meal. Breakfast and lunch from buffet trolley car, choice in different kinds of sandwiches and fillings, yoghurts, soup, bouillon, coffee, thee, juices, and lemonade.	Observation of the menu in bedside terminal
Appearance of frontline employees	Employees wear all the same outfit, different from the outfits of the nurses.	Observation on wards
Order system	Breakfast and lunch are chosen from the buffet trolley car. The nutrition assistant asks for the dinner choice in the afternoon, with the help of a tablet.	Dinner choice could be filled in till 3pm, but often this happened during lunchtime.

Hospital 2

Date: 09-05-2016

Table C: Observation form hospital 2

Aspect	Observations	Comments
Preparation of food	Food is prepared in central kitchen. As soon as an order comes at the kitchen the food will be fresh prepared. During peak hours the popular foods are already prepared, so that it only has to be distributed on plates. Thereafter the cold components will be added on a assembly line (salad, sauces, salt, suger, etc.)	Walk-trough with hospitality manager
Presentation - Colour of food - Portion size and volume - Crockery and cutlery	Food is served on a porcelain plate on a tray. A warming cover is placed over the food. Patients can decide on their own portion sizes (0,5; 1; 1,5). Porcelain and glasses cutlery and crockery. Coffee and tea on departments is in paper cups. Because patients compose their own meal, the kitchen can not decide on the colours used in a meal.	Observation in kitchen and on wards
The menu	Choice from a extended menu card with different starters, main dishes, and desserts, lunch, drinks, snacks. All individual components, whereof you can compose your own meal. Also a seasonal menu with every day another choice.	Observation of menu card
Appearance of frontline employees	Employees in call centre are not visible for patients. Care assistant wears the same outfit as nurses. Hospitality employees have different clothing; they are recognisable as hospitality employee.	Observation on wards
Order system	Patients have a phone on their bed side terminal. They can call the nutrition call centre and make a choice.	Observation on wards

Table D: Observation form hospital 3

Aspect	Observations	Comments
Preparation of food	Foods are ready made delivered on wards. Some departments have a cook who regenerates the food, on the other departments the nutrition assistants heat the meals. Only 2 actions may be done on the ward, for example adding cheese to the lasagne and heat it. Sandwiches are also delivered ready to serve.	Observation in satellite kitchens
Presentation - Colour of food - Portion size and volume - Crockery and cutlery	All foods are served in little glasses, pans, and plates. Modern crockery and cutlery. Portion sizes are fixed, but patients can take more than one meal a time.	Observation in satellite kitchens
The menu	Nutrition assistant offers three or four options to the patient per food provision moment. Choices are not known in advance for patients. The choice for dinner will be asked in the afternoon. 14 days food cycle. Sometimes, when the occupancy is high on the wards, the patients who will be helped last have fewer choices than patients at the beginning of the ward.	Observation on wards
Appearance of frontline employees	All employees wear a outfit from the external provider.	Observation on wards
Order system	Nutrition assistants take all choices personally, the patient chooses at point of consumption, only for dinner the choice will be asked in advance.	Observation on wards

Appendix 4: SPSS outputs

Importance of aspects

Table E: Importance aspects ANOVA

	Food service concept	N	Mean	Std. Dev.	Levene Sig.	ANOVA Sig.
Importance quality	Hospital 1	65	6,49	0,71	0,886 ^{ns}	0,881 ^{ns}
	Hospital 2	71	6,46	0,79		
	Hospital 3	79	6,53	0,76		
	Total	206	6,50	0,75		
Importance presentation	Hospital 1	65	5,60	1,36	0,103 ^{ns}	0,217 ^{ns}
	Hospital 2	71	5,44	1,36		
	Hospital 3	79	5,81	1,12		
	Total	206	5,62	1,29		
Importance choice	Hospital 1	65	5,77	1,18	0,100 ^{ns}	0,516 ^{ns}
	Hospital 2	71	5,90	0,94		
	Hospital 3	79	5,97	0,96		
	Total	206	5,88	1,03		
Importance service	Hospital 1	65	6,17	0,80	0,035 [*]	0,952 ^{ns}
	Hospital 2	71	6,20	0,50		
	Hospital 3	79	6,20	0,55		
	Total	206	6,19	0,62		
Importance autonomy	Hospital 1	65	4,25	2,00	0,000 ^{***}	0,000 ^{***}
	Hospital 2	71	5,76	1,22		
	Hospital 3	79	4,10	1,97		
	Total	206	4,72	1,91		

Significant at *p≤0,05; **p≤0,01; ***p≤0,001;ns not significant

The table shows that Levene gives significant values for the importance of service and autonomy. The ANOVA test shows only a significant difference between the food service concepts for autonomy. The Welch and Brown-Forsythe tests are done to check these values, and these tests give only significant values for autonomy (both p = 0,000). A post hoc test is done for the importance of autonomy to see where the scores differ. Because the sample sizes are slightly different the Gabriel test is conducted.

Table F: Gabriel test for 'Autonomy'

Hospital	N	Subset for alpha = 0.05	
		1	2
Hospital 3	70	4,1000	
Hospital 1	65	4,2462	
Hospital 2	71		5,76606
Sig.		,948	1,000

As shown in the table, the importance of autonomy is significant different in hospital 2 from hospital 3 and hospital 1. Autonomy is more important for patients in hospital 2 (mean = 5,76606) than for patients in hospital 3 (mean = 4,1000) or hospital 1 (mean = 4,2462).