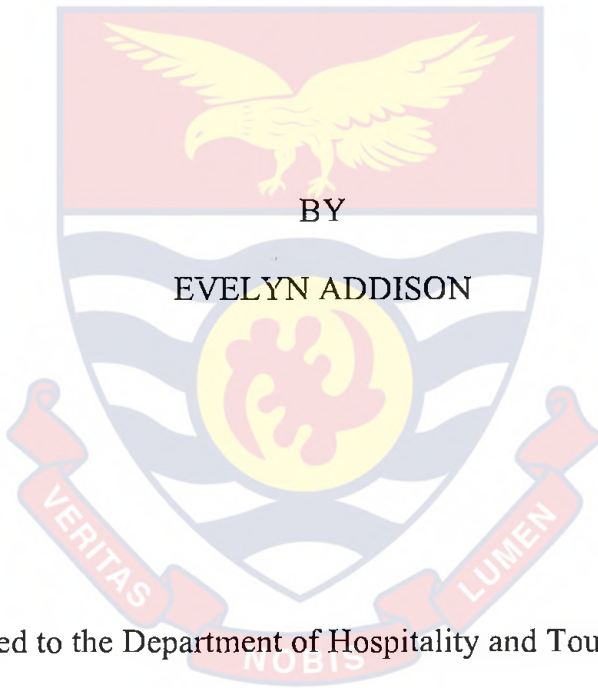


UNIVERSITY OF CAPE COAST

CULINARY NUTRITION LITERACY AND KNOWLEDGE AMONG
RESTAURANT FOOD PRODUCTION STAFF IN GHANA



BY

EVELYN ADDISON

Thesis submitted to the Department of Hospitality and Tourism Management
of the Faculty of Social Sciences, College of Humanities and Legal Studies,
University of Cape Coast, in partial fulfilment of the requirements for the
award of Doctor of Philosophy degree in Hospitality Management.

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DECLARATION

Candidate's Declaration

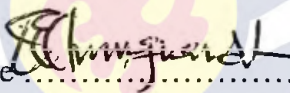
I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature  Date 12-09-2019

Name: Evelyn Addison

Supervisors' Declaration

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Principal Supervisor's Signature  Date 12/9/2019

Name: Prof. Francis Eric Amuquandoh

Co-Supervisor's Signature  Date 12-9-19

Name: Dr. Edem K. Amenumey

While the art of cooking tasty and well garnished food may be a pleasurable activity, food providers must be mindful of their role towards the wellbeing of their customers. They must, therefore, consider the nutritional aspect of the food they prepare and merge that with their culinary skills. This study assessed nutrition literacy and knowledge based on evidence from 497 food production staff in restaurants using a cross-sectional study design. It was revealed that the five leading sources of nutrition information were the internet, television, nutrition textbooks, cookbooks and the radio. The study also revealed the deficiencies in the level of culinary nutrition knowledge among the respondents. Their level of confidence in making culinary nutrition decisions was found to be generally moderate and varied significantly across the socio-demographic characteristics. The confirmatory factor analysis revealed that the respondents possess moderate functional literacy but high interactive and critical nutrition literacy. This suggests that not everyone proceeds in a hierarchical manner in attaining the optimal level - Critical Nutrition Literacy. It is recommended that tailored nutrition information to the respondents should take cognisance of the individual differences in their nutrition literacy skills. The language used in the dissemination of nutrition information targeting this group should also be diversified especially for the non-print sources incorporating the local dialect. Additionally, nutrition policies and interventions should be geared towards enhancing nutrition knowledge and increasing the confidence of food production staff in order for them to make culinary nutrition decisions for the wellbeing of their customers. Finally, this study serves as a basis for further assessment of literacy and knowledge in culinary nutrition.

Food production staff

Information

Literacy

Nutrition knowledge

Nutrition literacy

Restaurant



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DEDICATION

To my children: Sasha, Thess, Hugh and Gillis

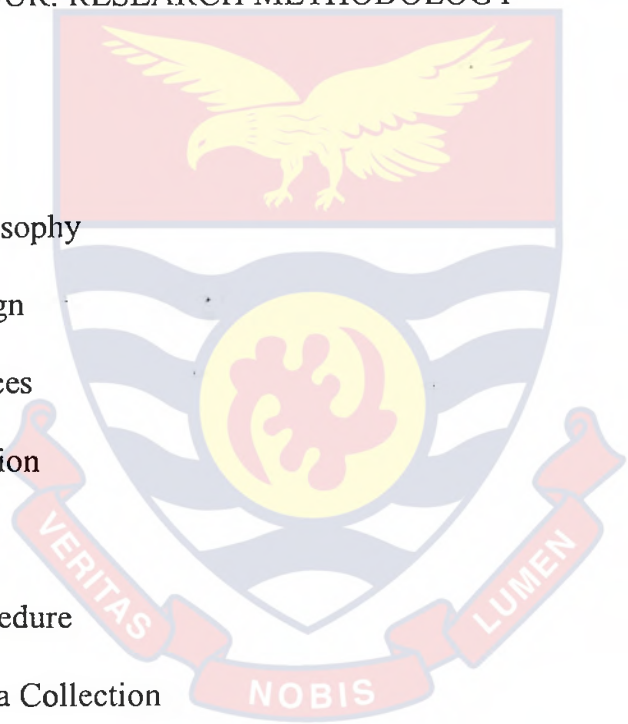


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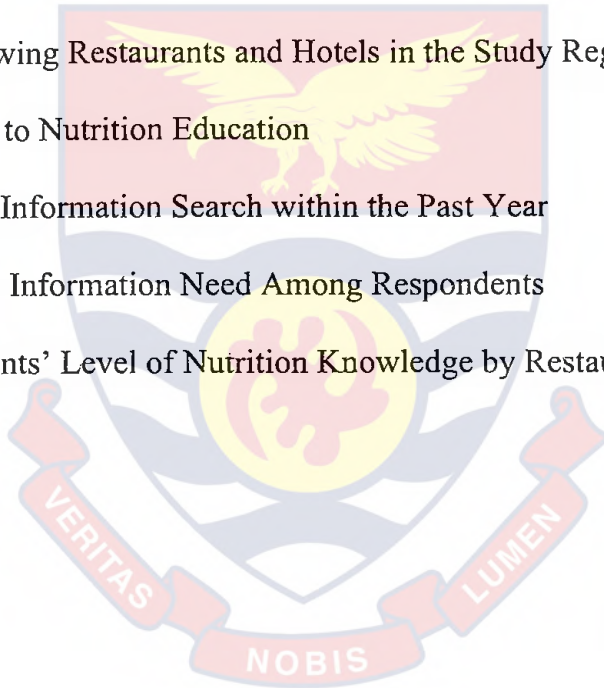
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S-TOFHLA Short Test of Functional Health Literacy in Adults

TOFHLA Test of Functional Health Literacy in Adults



INTRODUCTION

Background to the Study

Nutrition is a global issue that affects the wellbeing of individuals, throughout the lifecycle. In the history of human existence, food and nutrition has been thought of as a key factor in the development and maintenance of an individual's health. The word "nutrition" comes from the Latin word "nutrire" meaning "to nourish" (Zimmerman & Snow, 2012). Like all living organisms, the human body needs daily doses of nutrients to be able to function optimally. These nutrients are mainly derived from food, which makes it impossible to decouple food and nutrition; thus, the study of nutrition is directly related to food consumption. Food consumption can result in two main outcomes (Benn, 2014) – through food, an individual could experience satiety, pleasure and good health, but the same food could also pose health problems or even be a risk to an individual's health. Coincidentally, nutrients obtained from food could be used to prevent, manage or treat diet related diseases.

A nutrient has been defined as a substance needed by the body in sufficient quantity for energy, normal growth, development, reproduction, and maintenance of health (Hewlings & Medeiros, 2009; Khan, 1998). Nutrients found in food are grouped into six classes, namely: carbohydrates, lipids (fats), proteins, vitamins, minerals and water. All these nutrients must be present in a diet to support internal body processes. These nutrients have also been categorised under macronutrients and micronutrients. Macronutrients basically refer to nutrients such as water, lipids and proteins that are needed by the body

in larger amounts. In contrast, micronutrients are nutrients such as vitamins and minerals needed in such small amounts in a diet.

However, since no one food can supply all nutrients needed by the body, there is the need to select a variety of foods from the different food groups (Khan, 1998; Ministry of Health, 2009) to achieve a nutrition balance. Nevertheless, in today's fast paced life, food selection and production have become very complex, due partly to urbanisation and its resultant effects such as the refinement of foods (Khan, 1998) and abundance of convenience foods. These, coupled with other important factors such as frequency in eating out, taste preferences, less free time, loss of cooking skills, low nutrition knowledge and a wide gap between nutrition science and culinary art, make it difficult for individuals to select and prepare nutritionally sound food (Fitzgerald & Spaccarotella, 2009; Hughes, Bennet, & Hetherington, 2004; Wardle, Parmenter & Waller, 2000). As noted by Khan (1998), the greatest challenging task for most individuals is the ability to select or provide a diet that consists mostly of desired nutrients in the right proportion.

This situation is further complicated when it comes to mass cooking and one of the ways to overcome this is not only through the possession of adequate culinary skill, but also the awareness and knowledge in food and nutrition science. In the view of Cimbaro (2008), a population that is nutritionally literate is likely to impact positively on health promotion, disease prevention, and health maintenance. Thus, in the long term, healthy productive citizens are increasingly recognised as essential for the socio-economic growth of a nation (Food and Agriculture Organization [FAO], 2004).

Over the past 50 years, interest in nutrition has grown, especially among researchers and consumers. Among the many definitions of nutrition, the most frequently cited conceptual definition is that of the Council on Food and Nutrition of the American Medical Association which reads, “the science of food, the nutrients and the substances therein, their action, interaction, and balance in relation to health and disease and the processes by which the organism ingests, digests, absorbs, transports, utilizes and excretes food substances” (International Food Information Council Foundation, 2011).

Nutrition has also been defined as the science that interprets the interaction of nutrients and other substances in food in relation to maintenance, growth, reproduction, health and disease of an organism. It includes food intake, absorption, assimilation, biosynthesis, catabolism and excretion (National Institutes of Health, 2014). These broad definitions sum up all the processes involved in how organisms obtain and use nutrients, as well as simplify the complexity of the issue by linking nutrition and health. Hence, nutrition focusses on how diseases, conditions and problems can be prevented or enhanced with a healthy diet (Nordqvist, 2015).

The above definitions suggest that, although the process starts with the ingestion or the routine enjoyment of any food item; it does not end there. There are other important internal processes that take place immediately food is consumed. Due to the complex nature of these internal body processes and the other environmental and personal factors alluded to earlier, nutritional imbalances have been observed in most of the world’s population (Khan, 1998). Coincidentally, nutrients from food could be used to address that imbalance to improve the health of individuals suffering from diet related diseases.

By a large majority, this imbalance has become a grave health problem that must be handled at both micro and macro levels. The macro level encompasses efforts being made at national and international platforms to address the diet related diseases confronting our societies today. On the other hand, there are other efforts being made at the individual and societal (business) level to augment the efforts made at the macro level. This study is not an assessment of the macro-level efforts but will rather draw on its successes to offer credible direction to the types and channels of nutrition information available and accessible to food service operators.

Culinary nutrition, which forms the basis of this study, differs from nutrition science in two main ways – the definition and outcomes of the concept. In terms of definition, culinary nutrition is a term widely used to explain the application of nutrition principles (nutrition science) in combination with knowledge in food science, which is displayed through the mastery of culinary skills (Condrasky & Hegler, 2010).

Given the context of this study, the possible outcome of culinary nutrition as explicated by Condrasky and Hegler (2010) is the promotion of healthy eating behaviours produced from culinary confidence and nutrition alertness. Hence, by merging the science-based principles of nutrition and food with culinary arts, the vital food and nutrition information is made very practical, which becomes relevant in the context of food service operations. Accordingly, given the scope of this study, the focus is on culinary nutrition which encompasses the principles of nutrition and food science, and the culinary arts which is made applicable in restaurants.

Thus, a variety of Cape knowledge of food and nutrition is vital in the rationalisation of healthy eating behaviours, while the culinary skills are needed to transform the principles into healthy cooking practices in a restaurant setting. Coupling culinary arts with nutrition science facilitates the integration of food qualities like taste, satiety, and appearance along with nutritious goals (DeAngelis, Blenkiron & Vieira, 2001).

Over the past decade, one noticeable change in the eating habits of many people worldwide, including Ghanaians, has been the phenomenon of eating foods away from home. Foods consumed away from home have been described to include those obtained from fast food establishment, restaurants, schools and other public places (French, 2003). In the past, eating out was the preserve of travellers in inns and taverns (Fox, 2003), but now with the spread of restaurants among other factors, eating out has become a necessity for most people.

Generally, the trend of eating-out has become a significant aspect of modern lifestyle due to tremendous growth of the food service industry and various social and economic changes such as more working women, more two-earner households, higher incomes, and greater accessibility to fast food outlets and restaurants making eating out affordable and convenient, increased advertising and promotion by food service outlets, and smaller families (Choi, Kim & Yoon, 2011; Kwon, Park, Choe & Yang, 2014; Lin, Guthrie & Frazoa, 1999; Nayga & Capps, 1994).

Buoyed by an upsurge of urbanisation, this trend of eating out amongst consumers can be observed across both developed and developing countries, even though it may be more pervasive in developed countries. With the tremendous expansion in the restaurant business worldwide, customers' interest

in food has changed from mere satisfaction of a basic need to a health experience (Fernández-Celemín, & Jung, 2006). To a large extent, the responsibility of providing nutritious meals, which used to be the primary responsibility of the family (first primary agent of socialisation), has been transferred to commercial food providers, with the expectation that they will consistently deliver as expected. For societies to thrive, this responsibility must be handled efficiently.

This shift of responsibility from the family to commercial profit-oriented entities has implications for the continuous supply of nutritious meals to the many people who eat out. It has been noted that away-from-home foods usually constitute less fruits and vegetables, and milk while being high in saturated fat and calories (Keystone Centre, 2006) which contributes negatively to the health of individuals. To this end, the food service industry has been identified as one of the industries that can make significant contributions to improving the nutrition and health of individuals, given that increasing numbers of people are eating outside their home (Alonso, O'Neill & Zizza, 2012; Middleton, 2000) and are depending on food service operators to meet their daily nutrition requirements. Consequently, the participation of the food production staff in the provision of nutritious meals is critical to the health of their customers.

An important concern to address, therefore, is what is on consumers' plates in terms of nutrition balance. While the art of cooking tasty and well-garnished food may be a pleasurable activity, food providers must also be mindful of the fact that they contribute to the health of their customers. In most cases, consumers have little or no control over the nutritional constituent of the food they eat away from home. Some customers, however, are trying to adapt

home eating habits in the commercial food service environment and, therefore, crave healthy food options. So, if food service operators must assume full responsibility of the nutrition of their customers, then they must be nutrition literate and can combine nutrition science with their culinary skills. By extension, the nutrition literate food production staff need to facilitate the creation and maintenance of healthy eating behaviours of their customers through dining or eating out experiences. This is what this study seeks to investigate – what they know, how they get to know, and to what extent they utilize the information when they cook to guarantee the quality of food.

At the heart of the body of knowledge on nutrition is the concept of literacy. Generally, literacy can be defined as both skill-based and task-based (National Assessment of Adult Literacy [NAAL], 2003). The skill-based definition of literacy focusses on the tangible set of skills in reading and writing, which range from basic, word-level skills (such as recognizing words), to higher-level skills (such as providing appropriate interpretations of continuous text). On the other hand, task-based definition of literacy is the ability to use printed and written information to function well in society and to better develop their knowledge and potential. Simply put, literacy is an individual's ability to read simple sentences for knowledge and apply the knowledge when faced with either simple or complex task.

Hitherto, the concept of literacy was limited to an individual's ability to read and write (Ndahura, 2012); however, today it is no longer only about reading and writing but also includes the social environment (Cimbaro, 2008) and how individuals apply the knowledge in their various fields. Nonetheless, general literacy is very important because it enables people to better develop

their knowledge regarding specific content (such as nutrition) and improve their potential to achieve personal goals (Nutbeam, 2015). Without the fundamental reading ability, it is impossible to perform the higher-level tasks. In simple terms, Nutbeam (2000) described literacy by emphasizing what it enables people to do in everyday life. Literacy also encompasses individuals' ability to identify, make meanings and generate knowledge out of symbols and pictures. Meyer (2010) opined that pictures and visuals have almost substituted writing in terms of sending data, information and emotions. Therefore, literacy studies should necessarily incorporate individuals' ability to interpret nutrition-related pictures and visuals.

More so, literacy is context and content specific (Nutbeam, 2009; 2015). Context is an important indicator for understanding both the related concepts and the research setting. In the context of culinary nutrition in food service operation, literacy also plays an important role in accessing and utilising nutrition knowledge, and the skills needed to prepare nutritious meals. In the context of nutrition, literacy has been defined as the degree to which individuals have the capacity to obtain, process and understand basic nutrition information and the skills required to make correct nutrition decisions (Silk et al., 2008; Zoellner, Connel; Bounds, Crook, & Yadrick, 2009).

Nutrition Literacy has also been defined as “the set of abilities needed to understand the importance of good nutrition in maintaining health” (Labege; 2016, p.1). Embedded in the definitions is the focus on an observable set of cognitive and social abilities, which vary from individual to individual. Obviously, these skills enable individuals to seek, comprehend, evaluate and

use the information to make decisions that consequently lead to the provision of nutritious meals regularly.

Nutrition literacy can be categorized under three levels – functional, interactive and critical nutrition literacy (Ndahura, 2012; Nutbeam, 2000; Pettersen, Kjøllesdal, & Aarnes, 2009; Silk et al., 2008; Zoellner et al., 2009). Thus, to determine the nutrition literacy status of food service providers, an assessment of the levels of their functional, interactive and critical nutrition literacy should be undertaken.

Extant studies suggest that research on nutrition may require a topic specific approach. This study, therefore, focusses on nutrition by linking nutrition literacy to attaining a firm control over procedures to retain ingredients' nutrients throughout the food service subsystems. A food service subsystem identifies the flow of food from purchasing through cooking to reheating. In addition, a food flow helps to detect how nutrients leach out during storage of ingredients, food preparation and production, and to minimise the losses to improve the quality of food.

Nutrition literacy is linked to availability and access to information on food and nutrition. In the context of nutrition, information is an important resource that can potentially help food production staff to understand how to preserve nutrients from leaching out during food preparation and to contribute positively to the health of their customers through the execution of their responsibilities.

Nutrition literacy also incorporates the development of practical and cognitive skills to comprehend and apply nutrition information when purchasing ingredients, planning menus, and cooking and storing foods.

© UNICRS (2009) Identified the capacity to obtain basic nutrition information as the first element of nutrition literacy, and the capacities to comprehend and apply nutrition information as the other elements of nutrition literacy. Accordingly, the abilities and skills in seeking, understanding and utilizing information about nutrition issues may influence food production staff attitudes towards their responsibilities in the kitchen.

Borrowing from the concept of health information as defined by Lee and Cho (2005), nutrition information source can be described as any human or non-human party designed to assist individuals in information acquisition and processing concerning nutrition-related issues. Nutrition information sources are vast and attached to different sectors of the economy including the media, the health sector, and the government (Marquis, Dubeau, & Thibault, 2005). For a long time, dietitians and nutritionist have served as a major source of nutrition information for users of such information; however, other complementary sources are becoming more popular with the increase in media reports and dissemination of information through the internet (Ishikawa, Takeuchi & Yano, 2008b). So, as the sources and amount of nutrition-related information increases, it becomes important to study how food service operators seek and use such content in making specific nutrition decisions.

Food production staff encounter nutrition issues everyday both in their personal and professional lives. They are required to address the nutrition-related issues at all the levels in which the issues present themselves. Their ability to address nutrition-related issues at all levels of food production as well as deliver healthy diet is dependent on their 'nutrition literacy' levels. Emphasis is placed on professional behaviour because the actions and inactions of the

food service operators invariably affect the health of people who consume their food products. One common adverse effect is obesity, which puts individuals at risk of acquiring other diet related diseases, thus the importance of nutrition literacy in food service subsystems.

An increasing responsibility on the part of food services operators to make nutrition decision implies the need to constantly access nutrition information and the personal skills to comprehend and act on the information. Without adequate nutrition knowledge, it is impossible to plan and execute a well-balanced menu.

Statement of the Problem

Inadequate attention to nutritional requirements and its effect on people including diet-related diseases such as obesity, diabetes mellitus, cardiovascular diseases and cancers, have been reported in the literature (Cecchini et al., 2010; Ofei, 2005; Popkin, Adair & Ng, 2012; Popkin & Gordon-Larsen, 2004; Sakamaki, Toyama, Amamoto, Liu, & Shinfuku, 2005). It has been argued in the literature that nutrition illiteracy might be a major contributor to the poor health outcomes facing the world (Silk et al., 2008).

Evidence suggests that the rise in obesity in the last four decades correlates with an increase in frequency of eating commercially prepared foods (Condrasky, Ledikwe, Flood & Roils, 2007; Johnson, Raab, Champaner & Leontos, 2002). Lin, Guthrie, Frazao (1999) envisaged that, with time, the escalating trend of eating out coupled with the increased volume of food eaten out may adversely affect the nutritional quality of the diet. Almost two decades down the line, it has been firmly established that the frequency of eating out has

been coupled with a decline in the nutritional quality of diets (Kwon & Ju, 2014). The decline in the nutritional quality of diets raises a fundamental concern regarding the very meaning of the word “restaurant”. The word “restaurant” comes from the verb “to restore” and historically, was considered legally as “health food stores” (Fox, 2003).

The food service industry, therefore, has been criticised for contributing to the incidence of diet-related diseases in both developed and developing countries, even though it has not reached epidemic proportions in the developing world. This is because the food service industry provides commercial food services to the public and contributes directly to the health of the public. Chefs in particular have been flagged to have a major role to play in the preparation and service of healthy menu items (Condrasky et al., 2007). Although chefs recognize the importance of nutrition in menu planning, many of them are preparing meals that are not consistent with Dietary Guidelines (Johnson et al., 2002).

It is becoming increasingly difficult to ignore the issue of nutrition in the hospitality literature because of the linkage between nutrition and health. Nutrition in the context of food service sector is a subset of the extensive field of nutrition literacy; yet, it has received little scholarly research attention. The discourse on nutrition literacy is largely skewed towards health promoters and sparse in the available hospitality literature. Also, these studies have been situated mainly in the primary health care setting focussing mostly on adults (Aihara & Minai, 2011; Diamond, 2007; Weiss et al., 2005; Zoellner et al., 2009). Likewise, nutrition knowledge studies among restaurant food production staff (RFPS) are still limited as most of the studies are about nutritional

knowledge of consumers and chefs (Alonso et al., 2012; Johnson et al., 2002; Middleton, 2000; Reichler & Dalton, 1998; Roberts & Regan, 1991) to the neglect of other food production staff. The concept of literacy must, therefore, be translated into a culinary nutrition context to explore the degree of nutrition literacy among RFPS.

Furthermore, like school nutrition managers, the educational background and certification of RFPS differ greatly among food service establishments (Cater & Carr, 2004). Yet, these production staff are required to possess a host of complex knowledge and skills in taking nutrition decisions concerning food preparation and are also required to function well given their mandate as food service providers. Though these disparities (varying educational background and certification) are known, there is a dearth of published research on nutrition literacy and knowledge of RFPS, who contribute immensely to the health of many restaurant patrons.

Extant studies on nutrition literacy have focussed predominantly on individual's ability to make appropriate dietary decisions concerning their own health (Aihara & Minai, 2011; Diamond, 2007; Ndahura, 2012; Sampaio, Carioca, Sabry, Pinto, & Ellery, 2014; Weiss et al., 2005; Zoellner et al., 2009). Most of these works have established a strong relationship between low nutrition literacy levels and diet-related health outcomes. In addition, previous studies have focussed on the exploring the nutrition literacy construct. In the literature on nutrition literacy, the food service industry has been underrepresented. The skills needed by RFPS to seek and comprehend nutrition information and make appropriate nutrition decisions have not been thoroughly examined in the literature.

literacy and knowledge among school nutrition managers (Zoellner & Carr, 2009). This nutrition literacy study focussed on the ability of school nutrition managers to make appropriate nutrition-related decisions for the children and teachers they serve. Inferring from the findings of this research, it is possible to suggest that the components of nutrition literacy may also have direct relevance in the context of commercial food service operations, especially among RFPS who make daily decisions regarding the provision of food to customers.

Despite the increased interest in nutrition, it is surprising that very little empirical research on nutrition literacy and knowledge has been conducted in restaurants and, especially from the perspective of RFPS. Therefore, to bridge the gaps in the current literature, this study aimed at assessing the degree of nutrition literacy and knowledge among RFPS in Ghana.

Research Questions

The study was guided by the following research questions:

1. What are the sources of nutrition information for RFPS?
2. How much effort do RFPS put into their search for nutrition information?
3. What are the barriers faced by RFPS in seeking nutrition information?
4. What is the level of knowledge in culinary nutrition among RFPS?
5. What are the levels of nutrition literacy among RFPS?
6. How confident are the RFPS in making culinary nutrition decisions during food production?

The main objective of this study was to assess the nutrition literacy and knowledge level of RFPS in Ghana. The specific objectives of the study were to:

1. identify the sources of nutrition information used by RFPS;
2. analyse the extent to which RFPS search for nutrition information;
3. explore the barriers faced by RFPS in seeking nutrition information;
4. assess the nutrition knowledge of RFPS;
5. assess the nutrition literacy of RFPS;
6. assess RFPS's confidence in making nutrition decisions during food production.

Hypotheses of the Study

The thesis was guided by the following hypotheses:

1. H_0 : There is no significant relationship between the socio-demographic characteristics and nutrition information source preference;
2. H_0 : There is no significant relationship between socio-demographic characteristics and trust in information sources;
3. H_0 : There is no significant relationship between socio-demographic characteristics and time committed to search from information sources;
4. H_0 : There is no significant relationship between socio-demographic characteristics and confidence in making culinary nutrition decisions.

This study contributes to both theory and practice by highlighting important factors researchers and practitioners need to pay attention to in a nutrition literacy context. As noted in the problem statement, food providers have a responsibility to positively impact the health of their customer. One of the ways of understanding the contribution of RFPS to the health of individuals is by assessing their nutrition literacy levels. This will ensure the development of evidence-based interventions that are more likely to be successfully implemented.

In addition, the result of this study has revealed the prime sources to communicate nutrition information to RFPS. Food production staff spend a lot of time working in the back of the house (kitchen) and this situation can pose a barrier in communication. Hence, they may prefer a specific channel through which nutrition information is communicated to them effectively.

This study has the potential of revealing the perceived barriers RFPS encounter in their search for nutrition information that deserve attention. The outcome of this study will form the action to be taken by MoH and other food and nutrition training professionals to reduce the barriers associated with locating and comprehending complex nutrition information and to also explore ways of making trustworthy sources of nutrition information easily accessible to RFPS.

Further, exploring the functional, interactive and critical nutrition levels of RFPS may help nutrition educators and promoters (such as MoH, Nestle, food and nutrition department in tertiary institutions) to understand the potential

challenges RFPS encounter in seeking, understanding and applying nutrition information, given their literacy levels.

Additionally, the outcome of this study could stimulate nutrition-related government agencies (such as MoH, Food and Drugs Authority) and other nutrition training professionals to reflect on how nutrition information is communicated, given the different levels of nutrition literacy. This will further guide the choice of intervention to be performed later by government agencies and other training professionals, which might possibly include the type of literacy materials to channel to them. Depending on their literacy level, the beneficiaries may need either low-literacy materials or high-literacy materials. In addition, they might require materials with less print but composed primarily of illustrations, or audio- or video tapes to promote easy understanding of the intended messages.

Again, since the emerging field of health and nutrition literacy is in its infancy state and primarily limited to a clinical health care setting, this study can provide a foundation to explore nutrition literacy within the context of commercial food service operation by assessing the level of nutrition literacy among RFPS in Ghana. This study further adds to the discourse on the nutrition information seeking behaviour and application from the perspective of food handlers in Ghana. The results of this study can also serve as a reference point for monitoring literacy level over time to establish future changes.

This study is consistent with Sustainable Development Goal (SDG) 2, which seeks to end hunger, achieve food security and improve nutrition, and promote sustainable agriculture. Since the year 2015 when these goals were set, several interventions have been initiated to help achieve the targets set for 2030.

This study will contribute to the achievement of these goals in the sense that it is aimed at improving the health status of the many Ghanaians who eat outside their homes. It will be impossible to achieve development goals and improved standards of living if the potential and resources of societies are trapped in the vicious cycle of malnutrition and other diet related diseases (FAO, 2004). Food service establishments are now and will continue to be a source of food and nutrition for the Ghanaian public. The number of licensed formal sector catering establishments increased by about 53 percent between the year 2013 and 2017 (Ghana Tourism Authority [GTA], 2014-2018). This escalating trend emphasises the role of the chef and other food production personnel in producing and serving healthy menu options to the many people who eat out.

Furthermore, this study does not only help to fill the research gaps but can also contribute to the practical field of improving nutrition literacy and knowledge. For food service operators, the study has the potential to provide current insight on practical ways of utilizing nutrition information to retain food nutrients throughout food preparation and production stages. This may guide management of food service establishments to develop standard procedures to help reduce nutrients losses. In the long term, the food handlers would make strides towards the wellbeing of customers through the preservation of food nutrients and improvement of quality of commercial foods.

Finally; this study may provide opportunities for Hospitality and Home Economics nutrition educators to update the content and assessment of their nutrition course. The nutrition literacy skills component in this study may function as topics to be included in the nutrition course. The instrument developed in this study could also be a tool for assessing nutrition literacy of

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food production students. Ultimately, such an intervention will enhance the students' personal and professional lives after school.

Delimitations

The study focussed attention on independent graded restaurants and restaurants in star rated hotels in five regions in Ghana, namely: Greater Accra, Ashanti, Western, Northern, and Central region. Specifically, the study targeted only grades 1 to 3 restaurants and 1 to 3 star rated hotels. The study excluded the other catering establishments (such as fast food restaurants, pubs, snack bars) and the 4 to 5 star rated hotels. Within the restaurants, the focus was narrowed to only food production staff excluding the food service staff. Therefore, caution should be exercised as far as generalising the findings for all food production staff in restaurants in Ghana is concerned.

In addition, no attempt was made to fully trace which television programmes, magazines, or newspapers RFPS rely on for nutrition information and whether these specific choices were influenced by their background characteristics as that would be beyond the scope of this thesis.

Lastly, the knowledge assessment questions were developed by the researcher based on input from the expert panel and from extensive literature review. The questions are not exhaustive and were used only to gauge nutrient retention knowledge. Although it proved to be a good measure, other researchers should exercise caution when adopting it to other settings, because it is a measure of respondents' nutrient retention knowledge in the context of food production.

Limitations

This study employed the quantitative approach. However, studies of this nature are likely to be limited in some respects and, therefore, need to be fully acknowledged.

The primary limitation of this study is the issue of social desirability bias. Due to the seemingly sensitive nature of the topic, the respondents were likely to have been coached by their supervisors to respond in a favourable manner to present the restaurant in the best light. All the same, after explaining the purpose of the study and revealing the questions to the respondents, that element of bias was reduced, if not eliminated. This is because, the respondents gave responses independent of their respective restaurants. In other words, they were relaxed and did not see the exercise as a test of the restaurant's performance in terms of nutrition practices.

Further, findings from health literacy studies were relied on in the discussion of nutrition literacy in this study. This is due to the dearth of information on nutrition literacy in the literature. Nonetheless, since academic studies are largely intended to contribute to knowledge, the limitations of this study highlighted above present opportunities for future research in the continuance of the discourse and pursuance of knowledge on nutrition literacy in the restaurant environment.

Definition of Terms

Literacy: basic reading and writing skills necessary to follow simple messages.

Culinary nutrition: a term widely used to explain the application of nutrition principles (nutrition science) in combination with knowledge in food science,

which is displayed through the mastery of culinary skills (Condrasky & Hegler, 2010).

Nutrition literacy: the degree to which individuals have the capacity to obtain, process and understand basic nutrition information and the skills required to make correct nutrition decisions (Silk et al., 2008; Zoellner et al., 2009).

Functional nutrition literacy: having the basic reading and writing skills necessary to understand and follow simple nutrition messages, and the difficulties thereof (Ndahura, 2012; Nutbeam, 2000; Pettersen et al., 2009; Silk et al., 2008)

Interactive nutrition literacy: explained as more advanced literacy, which includes cognitive and interpersonal skills needed to extract nutrition information and derive meaning from different sources, in partnership with professionals (Ndahura, 2012; Nutbeam, 2000; Pettersen et al., 2009; Silk et al., 2008).

Critical nutrition literacy: the ability to apply more advanced cognitive skills to analyse nutrition information critically, increase awareness, and participate in action to address barriers (Ndahura, 2012; Nutbeam, 2000; Pettersen et al., 2009; Silk et al., 2008).

Nutrition knowledge: nutrition knowledge is defined in this study as the outcome (awareness or understanding) of the cognitive processes in relation to food and nutrition-related facts and information gained through education, practise and/or search. Without literacy skills individuals cannot build on their nutrition knowledge.

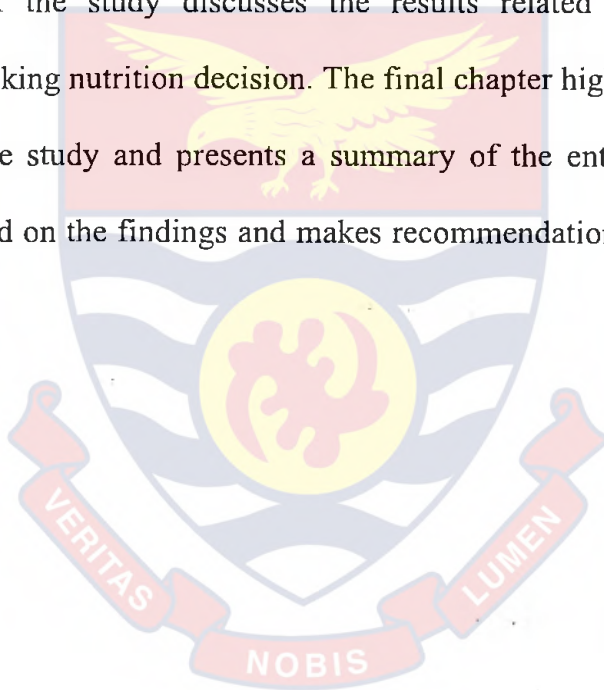
Organisation of the Thesis

The study is organised into ten chapters. The first chapter introduces the entire study whilst focussing on issues such as background to the study, statement of the problem, objectives and significance of the study. The second chapter focusses on the theoretical issues in nutrition knowledge and literacy, with specific attention paid to Social Cognitive Theory and the Levels of Nutrition Literacy. This chapter concludes with a framework that links the various concepts explaining the phenomenon. The third chapter of the study presents the empirical review pertaining to nutrition knowledge and literacy. Chapter four, was devoted to the research methods used to gather data to achieve the study objectives. The chapter begins with a description of the study area, followed by the research philosophy and design, target population, sample size and sampling procedure, data collection instrument, data collection procedure, and ends with data processing and analysis. Chapter five discusses the socio-demographic and employment characteristics of the respondents as well as their preferred sources of nutrition information. The chapter also discusses the relationship between the respondents' socio-demographic and employment characteristics and their preferred sources of nutrition information.

Chapter six of the study discusses the results on the search effort made by the RFPS in their search for nutrition information. In this chapter, trust, reliability, expertise, clarity, and accessibility, as factors determining the preference for a nutrition information source are also explored. Chapter seven of the study presents the results and discussion on the assessment of the nutrition knowledge level of the RFPS. In this chapter, barriers to and confidence in seeking nutrition information are examined in the light of respondents' nutrition

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knowledge. Further, this chapter explores the influence of socio-demographic and employment characteristics and four predictor variables on nutrition knowledge.

Chapter eight of the study looks at the results and discussion on Nutrition Literacy (NL) status of the RFPS. In this chapter, the relationship of the construct via the subscales of NL and its respective items are explored using confirmatory factor analysis. In addition, the predictors of the variance in the NL scale are explored using multivariate and bivariate linear regressions. Chapter nine of the study discusses the results related to respondents' confidence in making nutrition decision. The final chapter highlights the major findings from the study and presents a summary of the entire study, draws conclusions based on the findings and makes recommendations for policy and practice.



THEORETICAL AND CONCEPTUAL FRAMEWORKS

Introduction

This chapter presents the theoretical and conceptual foundations of nutrition literacy and knowledge. The themes discussed in this chapter include some conceptual accounts of literacy, nutrition knowledge, and theoretical explanations to nutrition literacy including Behaviourism, Social Cognitive Theory and the Levels of Nutrition Literacy. Effort was also made to link nutrition literacy to health literacy, since a general understanding of health literacy aids in the broader discussion of nutrition literacy. The appropriateness of these theories to nutrition literacy were also discussed. The final part of the chapter discusses the conceptual framework for this study.

The Concept of Literacy

The first step to the discussion of the concept of nutrition literacy is to establish a general understanding of literacy, which is very critical but a complex concept (Nutbeam, 2009). The first agreed international definition of literacy emanated from the UNESCO's recommendation of 1958 regarding the international standardisation of educational statistics. The definition states that "a literate individual is one who can, with understanding, both read and write a short simple statement about his or her everyday life" (UNESCO, 2004).

The central meaning of literacy directs policy makers on what goals, strategies and programmes to develop and adopt, as well as determines how advancement towards reducing illiteracy should be monitored and assessed

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(UNESCO, 2004). “Literacy is about more than reading and writing, it is about how we communicate in society. It is about social practices and relationships, about knowledge, language and culture” (UNESCO, 2003, p. 1).

Hitherto, the concept of literacy was limited to an individual’s ability to read and write (Ndahura, 2012). According to UNESCO (2006), until the late nineteenth century, the word ‘literate’ mostly meant to be ‘familiar with literature’ or in general terms ‘well educated, learned’. During the late nineteenth century, the concept of literacy was expanded to include abilities to read and write text, while maintaining its broader meaning of being knowledgeable or educated in a particular area. Since the mid-twentieth century, four understandings of literacy have emerged from the debate of the broader notion of literacy: 1) Literacy as an autonomous set of skills; 2) literacy as applied, practiced and situated; 3) literacy as a learning process; and 4) literacy as text.

The focus is extending further so that literacy is not only individual centred, but also to contextual and societal transformation, for example linking nutrition literacy to economic development (FAO, 2004; Lomborg, 2014). This suggests that literacy as a concept has now assumed a multidimensional nature. From UNESCO’s definition of literacy, literacy is perceived as a complex concept and no longer only about reading and writing but also includes the social environment (Cimbaro, 2008). Hence, in this study, literacy is conceptualised as the knowledge and skill requirements in culinary nutrition acquired through an individual’s ability to read and write.

The food service industry provides a window of opportunity that can be utilized by health promoters to ensure the adoption of healthy behaviours that

can help prevent the development of diet related diseases. The participation of food service industry, particularly the food production staff, is critical to the health of their customers. One of the ways of understanding the contribution of food production staff to the health of individuals is by assessing their nutrition literacy levels. This ensures the development of evidence-based interventions that are more likely to be successfully implemented. For restaurants to remain competitive in the food service business, nutrition intervention is paramount for chefs and other personnel.

Kickbusch (2001) suggested that literacy includes a number of skills needed for an individual to function well in a society. The discourse on literacy has expanded to include debate on other types of literacy and their practical application in everyday life (Nutbeam, 2000). Currently, a number of areas where such skills can enhance individuals' interaction in a society include health literacy, nutrition literacy, food literacy, eco-literacy, media literacy, computer literacy, cultural literacy, technological literacy, financial literacy and many others.

The Concept of Nutrition Knowledge

To make informed decisions or take informed actions concerning a situation, an individual requires general knowledge or knowledge specific to the situation. This knowledge is what Miller (2002) termed as "what we know"; when human beings assign meaning and interpretation to information, it becomes knowledge. What individuals know and understand, therefore, is obtained from available information, which is also initiated by an individual's

information need. It is worth noting that information needs change over time, and it is triggered by certain life events or societal changes (Van Dillen, 2004).

Knowledge has been expressed as a combination of factual and interpretive information that spearheads understanding or decision-making (Glanz, Rimer & Lewis, 2002). Declarative and procedural knowledge are the two main types of knowledge identified by cognitive psychologists (Barbosa, Vasconcelos, Correia & Ferreira, 2016; Worsley, 2002). Declarative knowledge is defined as the knowledge of facts or “what is”, and the awareness of things and processes. For instance, knowing that oranges contain vitamin C or heating food causes nutrient loss, especially vitamin C. Procedural knowledge, on the other hand, is the knowledge about how to do things or how actions are undertaken. For example, knowing how to process orange juice without losing vitamin C or how to prepare a nutritious meal.

In basic terms, nutrition knowledge can be explained as the knowledge of nutrients or having nutrition-related information (Cornish & Moraes, 2015; Worsley, 2002). This knowledge provides the basis for further processing of nutrition-related information when making food choices (Grunert et al., 2012) as well as making right decision in commercial food production. Due to the rise in eating out, disregarding the complex nutrition issues would mean causing a disservice to society (Renaghan & O'Brien, 1995), especially with reference to the food service industry, since a lot of people have transferred their primary responsibility of nourishing themselves and sometimes their family members to the commercial food service businesses.

In this present study, this knowledge only becomes practical when RFPS realize the benefits of nutrition to the health and wellbeing of their customers as

well as its application in food production. Since these food production staff could either be amateurs, novices or experts in issues regarding food and nutrition, the bigger issue then becomes how much of this knowledge does a RFPS need to possess to be able to apply the knowledge in food production. The answer to this question, for me, is dependent on the channels used in communicating nutrition information as well as the actual content being delivered to users, and whether they are delivering effectively based on the needs and preference of the users.

In addition, training of food production staff and managers in relation to food and nutrition within the food service sector remains indispensable to the acquisition of nutrition knowledge. As postulated a little over two decades ago, nutrition is very dynamic and as much as possible, training either on or off the job must reflect contemporary issues to address current issues in the food and food service industry (Renaghan & O'Brien, 1995).

Another important question is how much of this knowledge is applicable to the restaurant setting and how much of it can be applied to mass food production. Further, the individual in question and his/her abilities to acquire and apply nutrition knowledge to his/her personal and professional life is also a very critical factor worth considering. Worsley (2002) identified nutrition knowledge as one of the domains of declarative knowledge, while adding that declarative knowledge is essential for an individual's survival.

Cornish and Moraes (2015) reiterated that nutrition knowledge, as a concept, has not yet been clearly defined in the literature. Axelson and Brinberg had earlier stated that nutrition knowledge is a scientific construct created by nutrition educators to represent individual's cognitive processes in relation to

information about food and nutrition (Axelson & Brinberg, 1992). Drawing from the definitions by Axelson and Brinberg (1992), Cornish and Moraes (2015), and Worsley (2002), nutrition knowledge is defined in this study as the outcome (awareness or understanding) of the cognitive processes in relation to food and nutrition-related facts and information gained through education, practise and/or search.

Nonetheless, studies that have measured nutrition knowledge have tended to focus on nutrient content of food, sources and form of nutrients, nutrition terms, dietary recommendations, food guides, food labels among others (Sapp & Jensen, 1997). These constructs are usually abstract representations of several specific foods and nutrition-related objects but are measurable given the scope of research.

In this study, however, emphasis is placed on RFPS's awareness of nutrient retention and confidence in the application of retention strategies during food production. This is against the background that they need this knowledge to handle their responsibilities accurately but not necessarily to make personal choices. Additionally, most often than not, this domain of knowledge has been neglected in research.

Given all these, this study is also cogitating the fact that knowledge does not always result in practice. Notwithstanding, knowledge becomes a tool for individuals who desire to change (Chapman, Ham, Lieser, & Winter, 1995). Again, RFPS who are ready to drive the nutrition agenda are likely to seek inspiration from nutrition knowledge acquired over the period to meet the contemporary challenges they are faced with presently - of meeting the needs

of customers who want to indulge in healthy eating behaviours when they eat out.

Khan (1998) listed several reasons why food service managers need to possess adequate theoretical and practical knowledge of nutrition. These reasons include the following:

- To provide nutritionally balanced meals, it is important to purchase foods that are of high nutritional quality. To perform this important function, nutrition information is important.
- To preserve their nutritional quality, foods have to be handled and stored at proper temperatures and under correct storage conditions. Therefore, it is important to know the properties and shelf life of different nutrients.
- Nutrients can easily be destroyed or lost during preparation steps such as washing, cleaning, peeling, or coring foods. An understanding of nutrients and actions to prevent such losses are important.
- Proper methods of cooking should be selected to preserve nutrients. Thus, nutrition information is imperative to choose the most appropriate method of food preparation.
- Postproduction storage can also be a factor in preserving the nutrient contents of foods. Different foods require different methods of handling and delivery to preserve their nutritional quality.
- Nutrients can be lost while serving foods to consumers. Therefore, the manner of service and delivery requires careful planning by the food service manager.
- Utilisation of leftovers and menu forecasting require planning to achieve optimum benefits from the nutrients present in foods.

Drawing on the reasons cited by Khan (1998), it is credible to say that

food service operators need to be literate in nutrition issues concerning each stage in the food flow. They have to apply nutrition knowledge when purchasing ingredients, handling and storage, preparation, cooking, postproduction storage, holding (food service), and handling leftover foods. The outcome of these decisions could be enhanced if the decisions are based on relevant nutrition information.

The Concept of Nutrition Literacy

Nutrition literacy has drawn a lot of research attention in the past decade, and with many theorists and researchers defining nutrition literacy in several ways. Though there is no universal agreement on any simple definition, many definitions employ common features. Silk et al. (2008) defined nutrition literacy as the degree to which individuals can obtain, process and understand information and basic services in nutrition required to make correct nutrition decisions.

In an attempt to define nutrition literacy, Zoellner et al. (2009) substituted the word 'health' with 'nutrition' in the Institute of Medicine (IOM) definition of health literacy; thus, "the degree to which individuals have the capacity to obtain, process, and understand nutrition information and skills needed in order to make appropriate nutrition decisions" (IOM, 2004). Nutrition Literacy has also been defined as "the set of abilities needed to understand the importance of good nutrition in maintaining health" (Labege, 2016).

From the above definitions, it is obvious that there is no consensus on a universal definition for nutrition literacy; nonetheless, there is no conceptual variation in what constitutes nutrition literacy. In particular, individuals should possess abilities needed to acquire, process and understand behaviour-focused nutrition information (Figure 1). Deductively, nutrition literacy could be understood as the process of gaining an understanding of nutrition-related issues (nutrition knowledge) using ones reading and cognitive abilities.

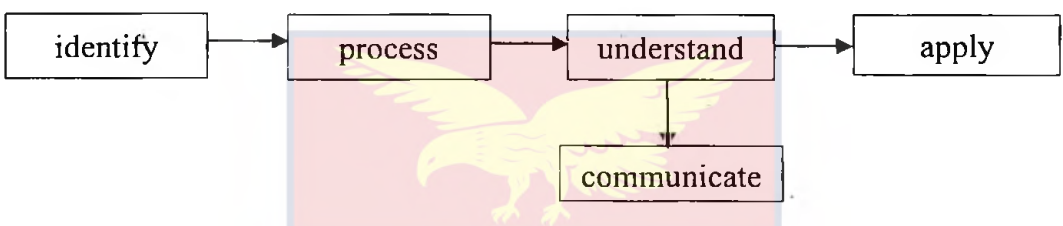


Figure 1: Domains of Nutrition Literacy

Source: Author's Construct (2017)

Another significant contribution of all these definitions is the link drawn by different authors between knowledge acquisition and application reflected in observable behaviour change. For RFPS, nutrition knowledge acquired from the search effort should subsequently lead to the provision of regular nutritious meals to customers.

Cimbaro (2008) and Block et al. (2011) are among researchers who have advanced some of the remarkable delineations of nutrition literacy. Nutrition literacy has been described by some scholars as 'applying nutrition' or 'practicing nutrition' (Barton & Hamilton, as cited in Larson & Marsh, 2005, p. 10). Similarly, Cimbaro (2008) conceived nutrition literacy as 'doing literacy' with the use of language, because it denotes a more active engagement.

“Nutrition is about everyday living, thus the ability of individuals to accomplish everyday nutrition literacy practices by participating in nutrition literacy events” (Cimbaro, 2008, p.44). This study also leans toward Cimbaro’s conceptualisation of nutrition literacy. This is because this study is focussed on participants who actively engage in nutrition literacy events on a daily basis by virtue of their obligations as food providers.

Nutrition literacy requires knowledge of complex nutrition principles and skills in food-related tasks (Gibbs & Chapman-Novakofski, 2013) and the application of the knowledge to achieve nutrition goals (Cornish & Moraes, 2015). Nutrition literacy comprises three elements (Block et al., 2011), namely: conceptual knowledge (i.e., reading and understanding information about food, nutrition facts, and food sources), procedural knowledge (i.e., actually using that knowledge in food shopping choices, preparation, and consumption) and motivation to act on that nutrition knowledge in various food situations and contexts (i.e., self-efficacy in food choices, preparation, and consumption).

The past two decades have witnessed the pervasive implementation of policies to address diet related disease throughout the societies around the world. There is a consensus on the link between literacy and nutrition or health outcomes. The issue is that literacy provides the skills for accessing nutrition information and making informed decision about food choices. Literacy is considered the first step in the learning process because it fosters understanding and stimulates interest in people to learn more (Fjørtoft, 1999). Nutrition educators rely on basic literacy to impart new knowledge onto individuals. On the other hand, individuals also require basic literacy to navigate their way around the stored knowledge, mostly in printed format.

The advances in health and nutrition literacy research has changed not only the environment in which individuals develop skills for life but also the ways in which groups (e.g. food providers) contribute to the creation and solution of diet related issues. Having nutrition knowledge has become important for life in modern societies, while the assessment of the skills has become a component of monitoring nutrition literacy and outcome/behaviour over time.

The Concept of Trust in Information Sources

Increasing demands for nutrition information from both scientific and non-scientific sources present a greater need to build and maintain trust between the communicators and users. This trust is built from presenting balanced information from credible sources, and from communicating these in ways that the general population will comprehend (Fernández-Celemín, & Jung, 2006). Trust in sources is also a good caveat to consider because it propels individuals to follow the messages. Put differently, trust in sources is an important determinant of message acceptance (Callison, 2001).

Most researchers have explained trust as a measure and/or constituent of credibility (Avery, 2010; Callison, 2001). Credibility is expressed as the judgements made by recipients of information concerning the believability of a channel or source communicator (Callison, 2001).

Definitely, there is the element of doubt or uncertainties because information consumers and audience are not scientists and they hold previously formed opinions (Harrabin et al., 2003). Notwithstanding, it is worth noting that the nutrition literacy status of an individual influences the extent to which they

trust the source of information as much as how the information is acquired (Zoellner et al., 2009).

Theoretical Perspectives

Four theories were reviewed to give the study theoretical guidance, namely: Behaviourism Theory, Social Cognitive Theory, Levels of Nutrition Literacy and Catering System Model. These models have been discussed in the ensuing section.

Behaviourism Theory

As a theoretical perspective, Behaviourism emerged in the 18th century. John B. Watson formally coined the term 'Behaviourism' in 1913 by studying how a certain stimulus led organisms to make responses. The behaviourist belief theorizes that learning is the outcome of observable and measurable changed behaviour with the learner exhibiting sequential skills and competencies (Huitt & Hummel, 2006; Kerr, 2010). Thus, it equates learning with outward behaviours that can be perceived and studied scientifically. Pavlov's study on classical conditioning (Pavlov, 1927) and Skinner's concept of operant response (Skinner, 1953), provided the basis for evidence-based application in behaviourism.

Behaviourists' understanding of behaviouristic learning is based on stimulus, the responses and the relationship that exist between them. The theorists believe that learning takes place when triggered by a stimulus and shaped by repetition/reinforcement. Thus, by rewarding learners for a correct response, desirable behaviours are reinforced (positive reinforcement). This

learning transpires as a result of observable changes in human behaviour that are acquired through conditioning, a process achieved by interactions with the environment (Brown & Green, 2006). So, if no changes are observed, then learning has not occurred.

This perspective also embraces the notion that teachers can play a significant role in stimulating learning, in deciding what to teach with objectives based on the desired behaviour. In relation to the food service sector, it should be noted that chefs and other kitchen supervisors have a critical role to play in the behaviours of their associates.

A further critical dimension to behaviourism is the transfer and application of skills, knowledge, and attitudes acquired in one context to another (Orlich et al., 2004). The transfer of learning demonstrates the capacity of the learner to relate theoretical exposure to practical application such that the beneficiary can impact real life situations with the gained knowledge and skills (Pham, 2011).

Nutrition literacy is understood and explained as the process of equipping individuals with specific abilities and skills and is defined by specific diet objectives and health outcomes. This understanding has dominated the literature and is widely espoused by researchers. The emphasis on skills has contributed to what is referred to as the behavioural approach to nutrition literacy. Behaviourism requires tasks that are highly context-dependent and repetitive. A very good example is the restaurant setting where convergent and repeated tasks are performed on a daily basis. In examining nutrition literacy from the behavioural perspective, emphasis is placed on sources of information, transferred knowledge, the tasks performed with respect to nutrition, the

desired behaviour, as well as the actual behaviour of the RFPS.

Even though the behavioural theory has contributed considerably to enhancing the understanding of human learning, it has been critiqued for several reasons, hence not suitable for this study. First, the theory assumes a one-dimensional approach to understanding human behaviour and holds constant individuals free will and internal influences such as moods, thoughts and feelings (Flores, 2013; Kompa, 2015). This limits the antecedents of nutrition literacy to only what is observable and measurable. Indeed, the thought processes and moods of an individual are vital in his or her personality and affects learning capabilities.

Again, the theory does not account for other types of learning, especially the type of learning that occurs without the use of reinforcement and punishment (Flores, 2013; Kompa, 2015). The theory is based on the premise that learning takes place in the presence of external factors, which is not always the case. In the restaurant setting, these stimuli (i.e., reinforcers and punishers) may not always produce the expected response. At the same time, regardless of what behaviour has been established previously through reinforcement, individuals are able to adapt their behaviour when new information is introduced (Flores, 2013). By discounting cognitive development, behaviourism does not help to fully explain human behaviour such as nutrition literacy and knowledge acquisition in the restaurant context. In combination with cognitivist approach, behaviourism could help RFPS with the acquisition of skills and knowledge to function well in their profession.

Social Cognitive Theory

The Social Cognitive Theory [SCT] (Bandura, 1986) is based on the premise that behaviour is influenced by the interaction between people's personalities and thoughts, and their social environment and context. Thus, all individual behaviour, cognition and other personal factors, as well as the environmental controls operate as interacting determinants and influence each other bi-directionally (Bandura, 1986; Carillo, 2010; Pajares, Prestine, Chen & Nabi, 2009).

SCT posits that human functioning is the outcome of reciprocal determinism, or the continuous and dynamic interplay of environmental factors, individual or personal factors, and individual behaviour (Figure 2). First, environmental factors are physical factors that are external to an individual which provide prospects and social support (Glanz, Rimer, & Lewis, 2002).

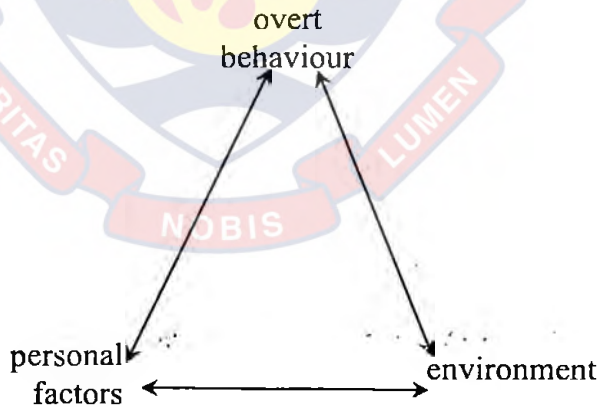


Figure 2: The Triadic Nature of Social Cognitive Theory

Source: Carillo (2010)

Secondly, personal factors are viewed as any cognition, traits, or demographic aspects characterizing an individual. Thus, people choose the

environment in which they develop; however, they also influence the surrounding environment (Carillo, 2010). Lastly, individual behaviour in a certain learning situation both shapes and is also shaped by the environmental and personal factors. When the behaviour is enacted and the individual receives positive feedback, then the person can confidently complete the behaviour. SCT is, therefore, useful in explaining how individuals develop and maintain certain behavioural patterns, while also providing the basis for intervention strategies (Bandura, 1997).

The theory is founded on four key elements, namely: human agency, human capabilities, vicarious learning and self-efficacy. Pajares et al. (2009) explained that the first two elements could be observed as the basis for developing social learning. The third element is considered the process through which learning takes place, whilst the fourth element inspires the overt display of those learned behaviours. The four elements are discussed below.

Human Agency

Bandura (1986) posited that individuals are autonomous and are capable of exercising a measure of control over their thoughts, feelings, and actions. Agency operates through the modes of individual, proxy and collective agency (Bandura, 1986; Pajares et al., 2009). *Individual agency* is exercised when an individual's own influence is visible on his/her performance and environment. Also, another person can secure benefits for the individual, which is considered desired outcomes obtained by *proxy agency*. Finally, *collective agency* is exercised when people work together to drive common interests.

Human Capabilities

Humans have the ability to symbolise, by extracting meaning from their environment, construct guides for action, gain knowledge by reflective thought, communicate with others over distance in time and space, and store information (Bandura, 1986; Pajares et al., 2009). More specifically, individuals possess the capacity to internally develop meanings associated with external influences, plan action and anticipate its consequences, and judge their own capability to accomplish tasks.

Vicarious Learning

SCT stresses the significance of observational learning, imitations, and behaviour modelling (Bandura, 1986). By observing the behaviour of others, an individual can also develop rules to guide his or her subsequent behaviour (Pajares et al., 2009, p.6). Through this means, individuals are able to learn new behaviours without the trial and error of performing them (Pajares et al., 2009).

Self-efficacy

As a central construct to SCT, self-efficacy helps to influence change in behaviour. Individuals need to develop the confidence to surmount obstacles and to successfully enact a specific behaviour. Bandura (1997) argues that individuals are not likely to enact a learned behaviour, unless they possess the self-efficacy to do so. Self-efficacy refers to the belief in one's ability to influence events that affects one's life or to perform a desired behaviour at designated levels (Bandura, 1989; Pajares et al., 2009). This makes self-efficacy

believes a better predictor of people's accomplishments than their previous attainments, knowledge, or skills (Pajares et al., 2009).

Efficacy differs in strength and is measured on a spectrum usually ranging from weak to strong (Bandura, 2006). Individuals who are less efficacious are easily negated by compelling experiences or challenges, whereas individuals who are more efficacious will persevere in their efforts (Bandura, 2006). However, a certain threshold of efficacy is desirable to initiate a course of action among individuals (Bandura, 2006). But then, a stronger efficacy will result in greater perseverance and successful performance of chosen activities.

Even though self-efficacy has the potential of predicting expected outcomes, it has its limits. Self-efficacy influences behaviour only when the right resources are available and can be easily accessed by individuals. In addition, individuals can only accomplish tasks that are within their capabilities. Despite these limits, researchers have been successful in establishing the value of self-efficacy as having the ability to motivate individuals to perform tasks amidst varying contexts (Bandura, 1995, 1997; Pajares & Urda, 2006).

In studying NL through the lens of SCT, emphasis is placed on both the cognitive abilities of respondents in gaining knowledge as well as the learned behaviour due to association with their team members. The SCT focusses on individual learning experiences and integrates the notion of perceived outcomes when explaining behaviour (Carillo, 2010), which makes it suitable for this study. The study adopts this theory because it helps to empirically understand how RFPS acquire nutrition knowledge from diverse content and behave professionally amidst other team members.

Consistent with the theory, knowledge is necessary to behaviour modification. SCT emphasises that an individual's behaviour is determined by the interaction of personal and environmental factors (Bandura, 1986; Carillo, 2010; Pajares et al., 2009). Thus, behaviour and its costs are influenced by individual choices, as well as events that take place within the environment of the individual. For this reason, RFPS acquire and build their knowledge daily from their interaction with, among other things, their colleagues, supervisors, and even the type of restaurant they work for.

Self-efficacy which is a central construct in SCT theory is useful in identifying challenges encountered throughout their experience with nutrition information sourcing and the confidence in making culinary nutrition decision. It is also valuable in the analysis of how they overcome these barriers and develop confidence in seeking and applying nutrition knowledge to their culinary tasks. Largely, most culinary nutrition programmes have been assessed using SCT framework (Bernardo, Jomori, Fernandes, Colussi, Condrasky & da Costa Proença, 2017; Condrasky, 2006; Kerrison, 2014). Although these studies did not focus on culinary nutrition literacy, they demonstrated how individuals model behaviours in a similar context in relation to healthy cooking. These studies also exposed the importance of self-efficacy to confidence in decision making.

The SCT, which includes the analysis of reciprocal relationship between individuals and their environment regarding a behaviour, fits the purpose of this study very well. The adoption of SCT as one of the major theories underpinning this study was because it presents suitable conditions for understanding RFPS's behaviour as a result of the exposure to nutrition information.

Levels of Nutrition Literacy

In the early 2000s, another conceptualisation of literacy emerged. Nutbeam (2000) criticized most of the definitions of health literacy as being narrow and lacking a deeper meaning and purpose of literacy for people. Nutbeam, therefore, proposed a three-level health literacy model that is widely applied in the studies of health literacy. This approach to describing health literacy classifies and orders skills in a hierarchy consistent with the increasing demand on an individual's cognitive efforts (Frisch, Camerini, Diviani, & Schulz, 2011). Nutbeam describes literacy by what it empowers individuals to do in everyday life.

Nutbeam (2000) differentiates between three kinds of health literacy. The three levels of literacy as identified by Nutbeam are functional, communicative/interactive and critical literacy. Level 1 consists of basic/functional health literacy that includes the basic reading and writing skills to be able to function effectively in everyday situation.

Level 2 consists of communicative/interactive health literacy. This refers to higher-level communicative and social skills required to extract, understand and discuss information with others. At this level, individuals are expected to evaluate health messages to be able to interact with others. According to Nutbeam (2000), people at this level of health literacy show "improved motivation and self-confidence" (Nutbeam, 2000, p.266). However, to reach this level, individuals require a solid foundation in functional health literacy.

Level 3 consists of critical health literacy skills that describe the advanced literacy, cognitive, and social skills to analyse information and make

informed decisions that support active participation in health promotion and prevention efforts. According to Nutbeam (2000, p.264), people at this level of health literacy are able to “facilitate community development”. This type of literacy “empowers individuals by helping them to recognise the social, economic, and environmental factors that influence health” (Cimbaro, 2008, p.4).

The model is valuable in assessing the literacy abilities required in various situations. Nutbeam’s (2000) tripartite model of health literacy has crossed disciplines and it is now widely used in general studies on literacy including nutrition literacy (Ndahura, 2012; Pettersen et al., 2009; Silk et al., 2008; Zoellner et al., 2009). Nutbeam’s (2000) health literacy model is a useful framework for assessing nutrition literacy status of food providers. It is a hierarchical model that allows for the assessment of vertical relationships among the three levels of literacy (Cimbaro, 2008).

The different levels are distinguished by an advanced level of knowledge and skills that progressively lead to greater autonomy and personal empowerment which results in an improved decision and behaviour that support good health (Nutbeam, 2000; 2009). Nutbeam, however, added that progression between the three levels does not only depend on cognitive development. Thus, an individual’s progression is also dependent on exposure to different information that is also mediated by personal and social skills; and self-efficacy in relation to defined issues (Nutbeam, 2000).

The limitation with this model, however, is the inability of the model to provide clearly in quantitative terms at what point individuals progress from one level to the other. If it is indeed a hierarchical model, then it is expected that

individuals having obtained one level would be propelled to the next level. For instance, Nutbeam makes mention of ‘sufficient basic skills’, and ‘more advance cognitive skills’ in describing the level of literacy skills needed by an individual. The question then is, “Are these words used qualitatively to emphasise the skills needed at each level or perhaps can be quantified?” This inconclusiveness affords researchers a window of opportunity to apply their subjective judgement to either confirm or refute the underlying notion of this model.

That notwithstanding, scholars who have incorporated Nutbeam’s model in their studies have been able to show the powerful impact of literacy skills needed under different situations to influence nutrition decisions and improve health (Ishikawa, Nomura, Sato, & Yano, 2008a; Kjøllesdal, 2009; Ndahura, 2012). Inferring from Nutbeam’s theorisation, nutrition literacy can be categorized under three levels of functional, interactive and critical literacy as shown in Figure 3 (Ndahura, 2012; Pettersen et al, 2009; Silk et al., 2008).

Functional Nutrition Literacy (FNL)

This includes the necessary basic reading and writing skills to be able to understand and follow simple nutrition information. It could also be explained as the extent to which an individual experiences difficulty in understanding and comprehending nutrition messages (Ndahura, 2012). This level essentially refers to an individual’s ability to engage with nutrition-related materials using basic literacy skills. If an individual is deficient in this skill, it becomes difficult to adhere to nutrition principles and recommendations presented in a written form, such as informational leaflets, nutrition textbooks and cookbooks. At this

level, communication is one way and neither promotes skill development nor autonomy (Cimbaro, 2008).

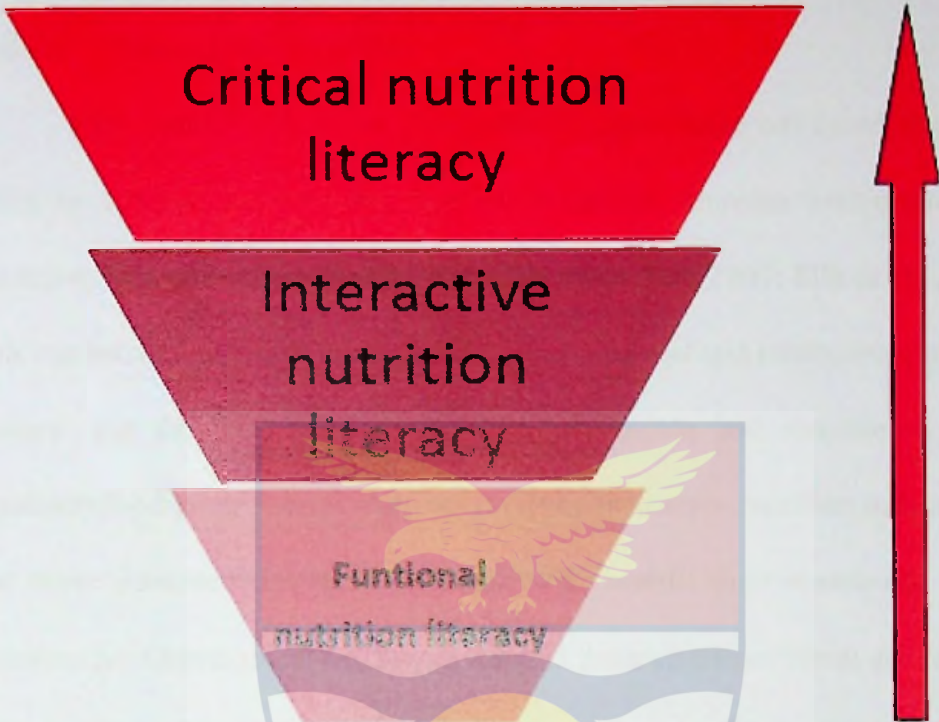


Figure 3: Levels of Nutrition Literacy

Source: Pettersen et al. (2009)

Interactive Nutrition Literacy (INL)

INL can be defined as more advanced literacy, which includes cognitive and interpersonal skills needed to extract nutrition information and derive meaning from different sources, and to apply new information to changing circumstances. Based on the knowledge gained through reading, individuals could suggest other cooking methods or recipe modification, or express their understanding on nutrition-related issues with their colleagues at work. This type of literacy focusses on the application of nutrition knowledge for the development of personal skills that enables an individual to live independently

(Cimbaro, 2008). At this level, communication is two way allowing individuals to tailor nutrition-related activities to their needs (Cimbaro, 2008).

Critical Nutrition Literacy (CNL)

CNL can be defined as the ability to apply more advanced cognitive skills to analyse nutrition information critically, increase awareness, and participate in action to address barriers (Pettersen et al, 2009; Silk et al., 2008). This top level of nutrition literacy builds on functional and interactive nutrition literacy. For the food providers to feel responsible and consistently offer nutritious food to customers, they must critically analyse nutrition information and make informed decisions that may well benefit their customers or the community. Communication, at this level, is deemed transactional as it allows for constant analysis, critique and feedback to ensure understanding (Cimbaro, 2008).

Nutbeam's tripartite model of literacy suggests an upward relationship between the levels of literacy. In principle, for individuals to reach the next level of literacy, they must first develop a sound foundation of functional literacy. Thus, they should first possess the ability to read and write in their local language or English. Undoubtedly, nutrition literacy is reliant on fundamental literacy and accompanying cognitive development (Nutbeam, 2000). It is, however, important to note that "functional literacy is situation-specific: someone's reading skills may be perfectly adequate in one setting and marginal or inadequate in another" (Parker et al., 1995).

Furthermore, nutrition literacy goes beyond learning the basic skills of reading, writing to include skills required by a person to understand and

interpret the complex information about food and their respective nutrients (Laberger, 2016; Ndahura, 2012). This implies that an individual with less functional skills could have less exposure to nutrition information, as well as not have matured skills to act upon the information received (Nutbeam, 2000). Within the context of nutrition, literacy provides an understanding of the basic nutrient groups, their respective dietary sources, and their relationship to maintaining good health (Laberger, 2016). Critical nutrition literacy, the top level is the ideal literacy level at which individuals are empowered to support not only individual but social action. To reach this top level, individuals should have improved upon the functional and interactive literacy levels.

The nutrition literacy status of individuals influence how they seek nutrition information, as well as their level of trust in the sources of the information (Zoellner et al., 2009). In examining nutrition literacy from the perspective of restaurant food providers, emphasis is placed on their literacy levels, as well as the difficulty they encounter in reading nutrition-related resources. This is because according to Laberger (2016), illiteracy and the readability of some nutrition information may have major influences on the nutrition literacy of individuals.

Finally, through Nutbeam's model, it is evident that food providers need to have the ability to access and process the complex and dynamic nutrition information available to be able to act autonomously and eventually affect the wider community positively. This is necessary because nutrition information is now extensively and increasingly available from diverse sources including the internet (Laberger, 2016). Based on the advantages of the model provided above,

Pettersen et al. (2009) Levels of Nutrition Literacy model provides the theoretical underpinning for assessing nutrition literacy levels of RFPS.

A Conceptual Model of Nutrition Literacy

Inherent in many literacy models is the lack of holistic measures to guide the conceptualisation and assessment of literacy in specific domains such as nutrition literacy. To fill this gap, Cimbaro (2008) proposed a conceptual model of nutrition literacy. Expanding on Nutbeam (2000) and Pettersen et al.'s (2009) tripartite model of health literacy, this model also implies a vertical relationship between the three levels of literacy or lateral relationships between the goal, content and outcome of each level (Cimbaro, 2008).

However, as a variation on Nutbeam's (2000) and Pettersen et al.'s (2009) conceptualisation, Cimbaro's (2008) model is illustrated with a Venn diagram. At the core of this model is the emphasis on the complex and dynamic nature of literacy. Literacy is a complex concept that is more than the mere comprehension of reading and writing but also includes the social environment, which is made up of politics, culture and history (Cimbaro, 2008).

Literacy is, therefore, defined by the interactions between three components; namely: language, action and ecology. These three components are interconnected and influence each other. They are also influenced by the social environment, which makes their relationship dynamic because of the dynamism in the social environment. Inferring from the understanding of literacy, nutrition literacy occurs at the point where the three components meet in the Venn diagram. Cimbaro (2008), therefore, preceded the three components

with the word 'nutrition' to read – nutrition language, nutrition action and nutrition ecology. This interconnectedness is illustrated in Figure 4.

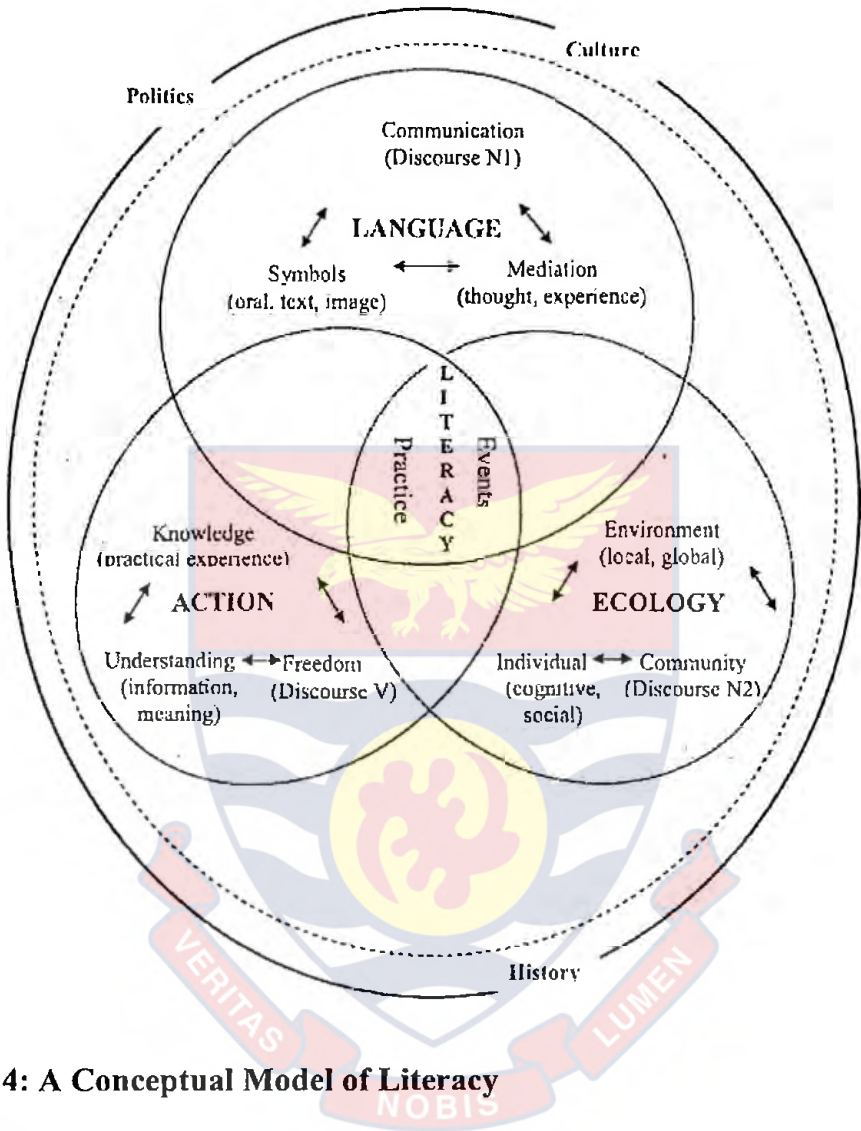


Figure 4: A Conceptual Model of Literacy

Source: Cimbaro (2008)

The model stresses that an influential change by one context in one element can cause single or multiple changes in other contexts. Therefore, depending on the nutrition literacy event, emphasis might be placed on one element than another. Integrating the definition of nutrition science and the literacy model, nutrition literacy is visualized as a tool for helping individuals make healthier choices.

Nutrition Language, the first component of the model, makes it possible for individuals to communicate nutrition information, understanding and knowledge. The language component encompasses symbols, communication and mediation. Cimbaro (2008) explained symbols as nutrition-related words, concepts and ideas that are expressed orally or in text and/or in the form of images.

Individuals can communicate with common understanding when they are familiar with nutrition terminology (for example, nutrient retention) and images (for example, food guides). Communication, in this case, is the act of exchanging or sending nutrition words, concepts and ideas from one person to another. Nutrition language mediates between the individual, people and nutrition experiences.

Nutrition action, which is the second component of the model, emphasises the ability of individuals to use language to enable them to freely make the most informed nutrition decisions. Individuals gather nutrition-related information from different sources. Hence, the ability to create meanings from the information communicated through language is a form of action individuals participate in. In examining nutrition literacy from this angle, emphasis is placed on understanding the meaning that individuals perceive during their engagement with nutrition information.

Communities (in this case, the food production team) create common understanding of nutrition in the same way. Subsequently, individuals and communities, through language, use these meanings to create and act upon knowledge. This practice can then be observed and measured. It enables people

to answer the critical question- what should be done to ensure universal access to nutritious, culturally appropriate foods?

Action, according to Cimbaro, “implies the ability to apply knowledge and learn from experience” (Cimbaro, 2008, p.47). The action dimension as applied in this study includes an understanding of how to plan and prepare nutritious foods, comparing nutritional analysis of various cooking methods, storing ingredients and left-over food properly, holding, and reheating food properly.

Nutrition action also involves the freedom to engage with nutrition information; the freedom to use language to create personal meanings and gain nutrition knowledge; and the freedom to analyse group understandings and knowledge practices about nutrition that might constrain best practices. Nutrition action is a process that uses language to analyse the cultural, historical and political structures that might interfere with people’s ability to freely create and practice their nutrition knowledge and conversely promote the necessary changes to freely act. Therefore, nutrition action relies on an interconnected and interdependent relationship between nutrition understanding, nutrition knowledge and nutrition freedom (Cimbaro, 2008, p.49).

Regarding “Nutrition Ecology”, Cimbaro (2008) describes environmental factors that impact an individual’s behaviour. Language connects individuals, communities and environments by means of a complex, interconnected and interdependent communicative web, which enhances the sharing of vital information, understandings and knowledge about nutrition. Though an individual’s understanding of nutritional thought, symbols and meanings may depend largely on their cognitive ability; it is the interactive

domain (like home, school, workplace and other social settings) which affords the individual a vast array of nutritional language tools. Thus, individuals are susceptible to the communities' socially constructed language when constructing their own nutrition.

An individual's or group's ability to develop nutrition language and participate in nutrition action also occurs within the cultural, political and historical milieu of a nation. These macro level factors explicitly influence the nutrition literacy of individuals. Nutrition ecology, therefore, "relies on the interconnection and interdependence between the individual, the community and the environment as they relate to nutrition" (Cimbaro, 2008, p.49).

Nutrition literacy occurs at the intersection where the three domains intercept, while functioning within the contexts of politics, culture and history. It is in the areas of overlap where small literacy events occur and successively become a coherent set of nutrition literacy practices. Cimbaro (2008) posits that it is at this point that the individual can apply the learning from nutrition literacy events to everyday nutrition literacy practices to accomplish a goal. For example, the nutrition literacy practice of consistently providing nutritious food might include the following nutrition literacy events: confidence in planning nutritious menu items, purchasing and receiving quality ingredients; preparing and cooking foods using methods that preserve nutrients, storing and holding according to standards and reheating left-over food properly (Figure 4). Other events include cultural understanding of food and its preparation, and policies on purchasing receiving and storing ingredients. Nutrition is very complex and dynamic; therefore, the ability of individuals to manage nutrition problems daily makes them nutrition literates.

This model, however, has some weaknesses. The model is not based on any empirical test and acts more like a theoretical model. Again, the model incorporates other elements which are beyond the scope of this study such as, politics, history and culture. This makes the model heavily data-driven, requiring more time and financial resources which are not always readily available in cross-sectional studies. Despite these drawbacks, the model could provide implicit testable hypotheses on nutrition literacy, hence provides good grounds for exploring the topic.

Food Service/ Catering System Model

Food service systems are understood to be complex socio-technical organisations involving both people and machinery in the production and service of food (Smith & West, 2003a). The catering system has its origins in the systems theory and generally focusses on the holistic organisation of the inputs, which are transformed into desired outcomes. In this sense, it is very viable to identify the various subsystems, understand their interaction and monitor to achieve the desired outcomes.

It is perceived that foods that are produced in large quantities (mass production) are of low nutritional quality than traditional food preparation that is characterised by smaller quantities in home setting. Commercial food service is characterised by some unique factors that make it different from other products and services (U.S Department of Agriculture, Food and Nutrition, and National Food Service Management Institute [NFSMI], 2002). Some of the characteristics include:

1. Demand for food occurs at peak times, around breakfast, lunch, and dinner meals, there are valleys or slow times;
2. Demand for food may vary depending on time of year and competitive events, and production must be modified accordingly;
3. Both skilled and unskilled labour is needed; and
4. Food is perishable, requiring it to be handled properly before, during, and after preparation.

All these characteristics have nutritional implications for the final product that is served to customers, and subsequently create challenges in production which must be managed efficiently. Food service operators must always explore ways to reduce the impact of these characteristics to continue providing nutritious food.

One of the major inputs in the food service system (Figure 5), besides the food ingredients, is an adequate number of skilled people to handle the production and service. Usually in the kitchen, staff without the necessary skills are made to help with food preparation. Without the necessary nutrition knowledge and skill, these staff could contribute to nutrients losses out of ignorance. The preparation stage is a very critical stage where some food nutrients could easily be lost. Activities under this stage must attract equal importance as the other stages. For example, staff members without the necessary skill but handle food should be supervised regularly.

There are modifications of arrangement that can be adopted to manage catering system. Basically, there are three classifications, namely: cook-serve/integrated food service system, food-manufacturing and meals-assembly/food-delivery systems (Smith & West, 2003a). Each of these

classifications have their unique characteristics, hence varied nutritional implications. The systems are characterised by the production and service location, the ‘time buffer’ between production and service, the forms of food purchased, methods of holding prepared foods, and the amount and kind of labour and equipment required (Payne-Palacio & Theis, 2009; Smith & West, 2003a).

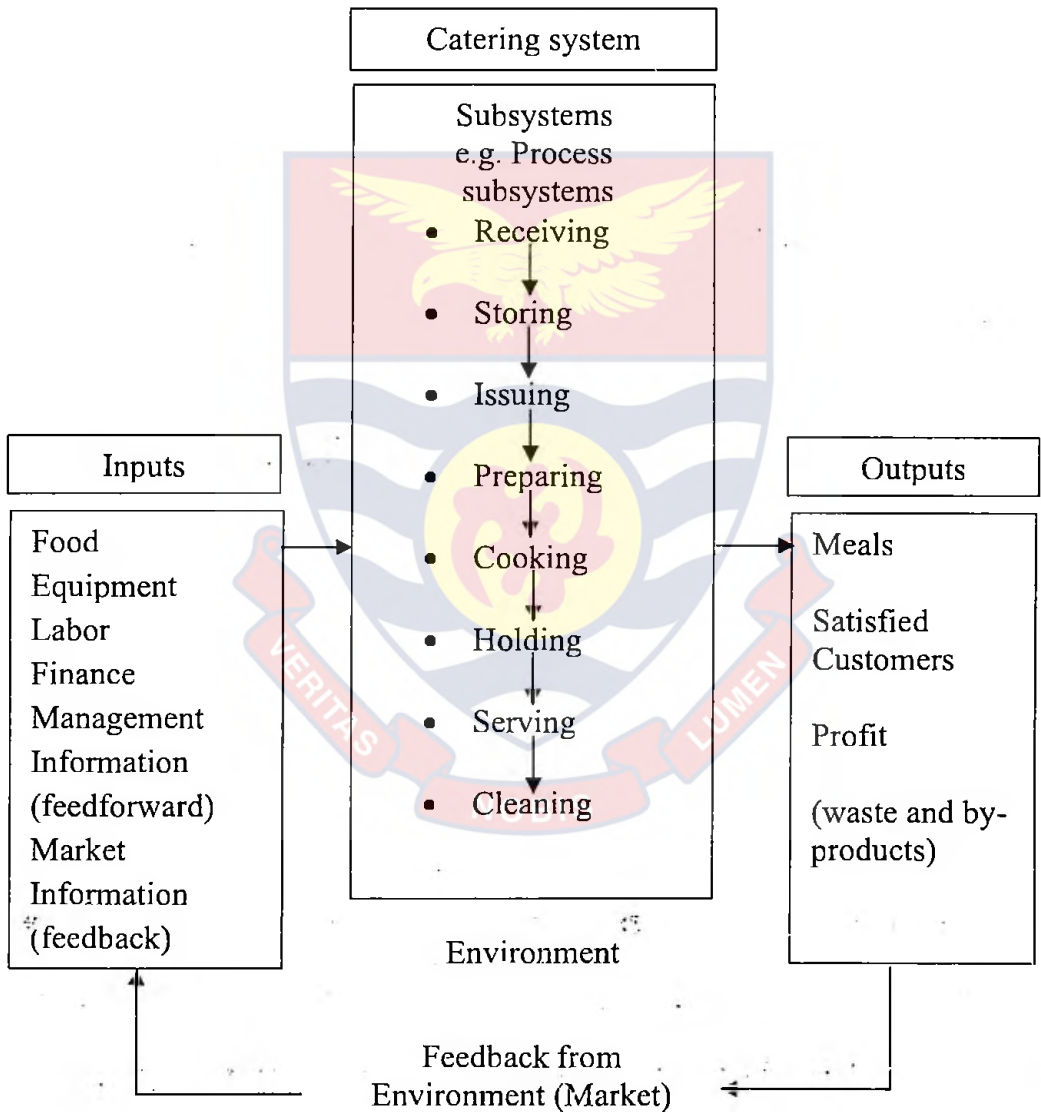


Figure 5: Model of Catering System

Source: Smith & West (2003a)

Firstly, cook-serve/integrated food service system represents a

conventional approach to catering whereby both the preparation of food and its service are in an integral function carried out in a single operation. This system operates with little delay between production time and service time. However, should there be any delay in service (especially in the case of bulk cooking), there could be an appreciable loss to the sensory and nutritional quality of the food. Time and temperature changes can affect the colour, texture, and flavour of the food. Some heat sensitive vitamins such as thiamine and vitamin C can also be lost.

Next, the food-manufacturing classification features a system where the production of food is decoupled from the service of meals. This system, therefore, relies heavily on the use of chilling and freezing methods to preserve the food until required. Food is produced in large quantities, portioned, chilled or frozen and used later utilising a regenerative method such as reheating. There is the possibility of nutrient deterioration if the production, storage and regenerative methods are not observed appropriately.

Finally, meals-assembly/food-delivery system focusses on the assembly, regeneration, and service of meals. With this system, the operation engages in very little or no actual food preparation, therefore does not require the traditional kitchen set up. The sensory and nutritional value of the food could be lost if the regenerated food is subjected to another period of hot holding before service.

For any food service operation to meet its goals, there are many distinct but closely related control points that must be identified and well managed (Lattin, 1995). Understanding how food flows through the food service process subsystem is very key in determining which stages and activities are critical for

nutrients losses or retention. Thus, the flow of food through a food service process subsystem has nutritional implications for the final output from the system. The process subsystem features six major stages as shown in Figure 6. The food service process subsystem helps to identify food nutrients that can be lost during the preparation and production process and to minimize the losses. In view of this, an understanding of nutrients and the introduction of measures to prevent such losses are imperative in commercial food service operation.

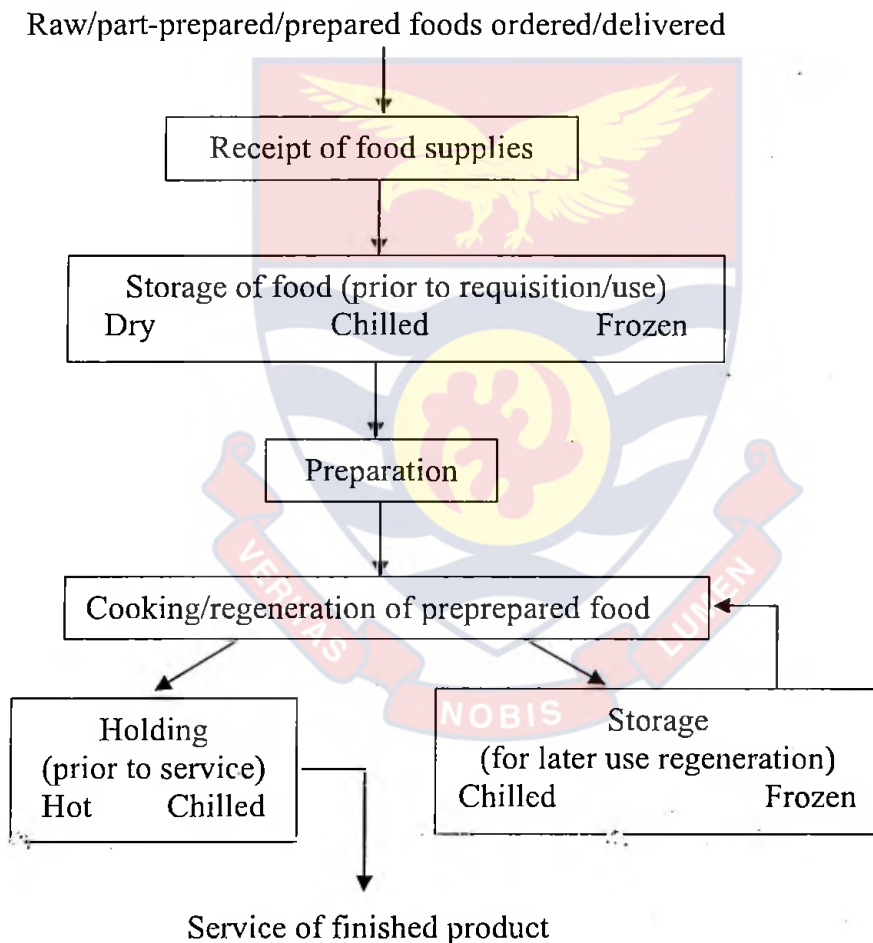


Figure 6: Catering Process Subsystem

Source: Smith & West (2003b)

The management of the food service process subsystem has both positive and negative implications for the nutritional quality of the output.

Typically, the preparation and cooking of the food ingredients render the nutritional benefit of the food (Smith & West, 2003b): During food preparation and cooking, the raw food ingredients are exposed to heat, air, water, light, which are necessary in the extraction of the nutrition needed by the consumers. However, there are several chances for an ineffectively managed food service process subsystem to contribute significantly to the preventable deterioration of the nutritional value of the food ingredients (Smith & West, 2003b). For instance, fruits and vegetables are peeled with the aim of enhancing their visual appeal and eating quality. Nonetheless, the overall nutritional value of the food could be reduced, and important vitamins lost through leaching during the cooking process.

While some nutrients can withstand the effects of the exposure to these elements, other nutrients cannot. Comparatively, macronutrients are more stable during storage and heat processing than micronutrients. Notwithstanding, micronutrients vary in terms of stability. Minerals present in food, for instance, are heat-stable and are not destroyed during cooking. However, some of the nutrients can leach out when the ingredients are soaked in water a long time.

On the other hand, while fat soluble vitamins (A, D, E, and K) found in meats and nuts for example are relatively stable, the B-complex of vitamins and vitamin C (largely supplied by fruit and vegetables) are vulnerable during storage, preparation and heat processing and liable to oxidation (Hewlings & Medeiros, 2009; Smith & West, 2003b; Thompson & Manore, 2012; Wardlaw & Hampl, 2007). Therefore, if the ingredients providing these nutrients are handled properly, then the process subsystem could only account for minimal deterioration during the processing. Since skilled employees are a major input

in the food service system, staff training should emphasize the importance of minimizing waste which invariably helps to maximize both the nutrient contents and the potential profits (Smith & West, 2003b).

The food service/catering system model benefits this study in two ways. Primarily, it forms the basis for the assessment of nutrition knowledge. The knowledge assessment questions focus on nutrient retention strategies underlined by four of the stages, namely: storing, preparing, cooking and holding. It is assumed that RFPS have a high level of appreciation and control over the quality of food given the four stages.

Additionally, the food service subsystem underlined the assessment of the nutrition action taken by RFPS during food production. Again, using the four stages (storing, preparing, cooking and holding), their perceived confidence in handling daily tasks associated with the four stages will be understood. It is also assumed that since they are confronted with the responsibility of preparing nutritious meals daily, they have control over the decisions necessary to retain the quality of nutrients during food production. However, the study did not focus on the other six stages as they are not within the scope of this study.

Conceptual Framework for the Study

Given the scope of this study, choosing only one of the aforementioned models to assess nutrition literacy and knowledge among RFPS would have proven futile. A more realistic way out of this problem was to incorporate the perspectives given by the different authors (Cimbaro, 2008; Nutbeam, 2000; Pettersen et al., 2009; Smith & West, 2003a). Therefore, the Levels of Health

Literacy (Nutbeam, 2000), Levels of Nutrition Literacy (Pettersen et al., 2009), the Conceptual Model of Nutrition Literacy (Cimbaro, 2008) and the Model of Catering System (Smith & West, 2003a) provided the conceptual guidance for this study (Figure 7).

The framework describes the domains of nutrition literacy and knowledge, and the relationship between individual and environmental antecedents, nutrition literacy levels and knowledge, and confidence in making nutrition decision. The framework also embraces the complex and dynamic nature of nutrition literacy and knowledge. As shown in Figure 7, the model first focusses on the antecedents to nutrition literacy and knowledge, namely: individual factors and environmental factors. The individual factors are elements characterising an individual. The individual factors comprise three sub-domains which include information seeking behaviour, socio-demographic characteristics and employment characteristics.

Information seeking behaviour includes information need, information sources, confidence in seeking, trust in sources, and time committed to searches. These factors equip the individual with the ability to expand one's vocabulary and gain conceptual knowledge through the thought processes, as well as building the confidence to spend more time searching from credible and reliable sources. The other sub-domains allow for the analysis of relationships between socio-demographic and employment characteristics and other dependent variables. The socio-demographic and employment characteristics both influence the information seeking behaviour of individuals.

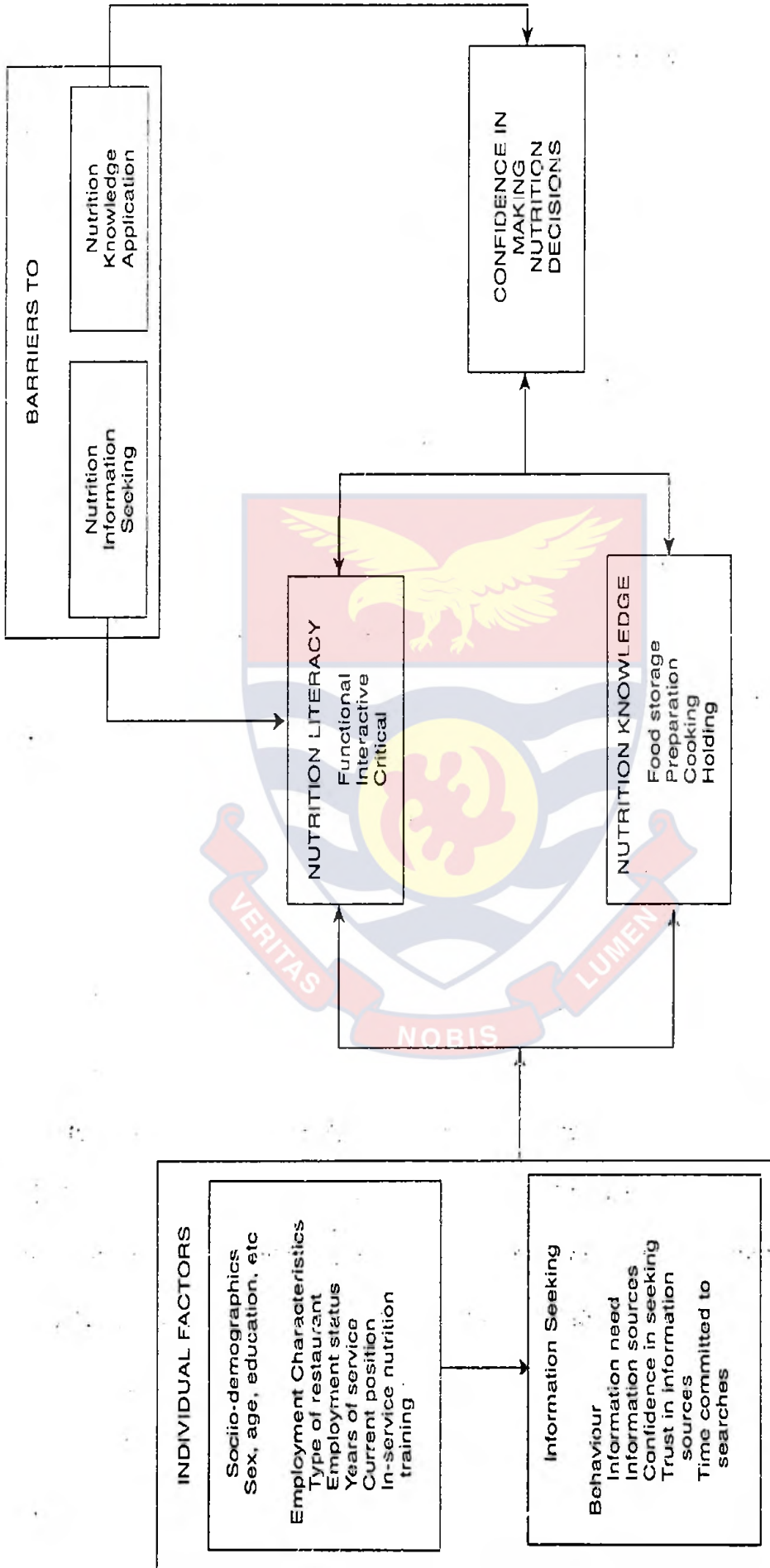
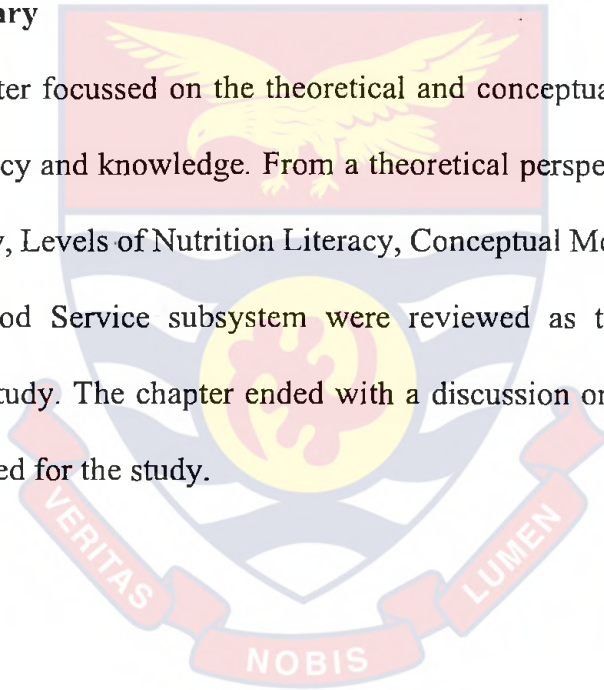


Figure 7: Conceptual Framework for the Study
 Source: Adapted from Cimbaro (2008); Nutbeam (2000); Pettersen et al. (2009); Smith & West (2003 a & b)

The second domain is nutrition literacy which is subdivided into functional, interactive and critical nutrition literacy. The third domain is nutrition knowledge focussing on the critical control points in the food flow stages. The second and third domains are related and reinforce each other. They both depend on the individual factors, and the barriers to seeking information. The entire process subsequently leads to the confidence in making nutrition decisions.

Chapter Summary

The chapter focussed on the theoretical and conceptual underpinnings of nutrition literacy and knowledge. From a theoretical perspective, the Social Cognitive Theory, Levels of Nutrition Literacy, Conceptual Model of Nutrition Literacy and Food Service subsystem were reviewed as the foundational theories of this study. The chapter ended with a discussion on the conceptual framework adapted for the study.



CHAPTER THREE

NUTRITION LITERACY AND KNOWLEDGE

Introduction

This chapter presents an empirical review of studies carried out in nutrition literacy in general and particularly that of school nutrition managers. This review is aimed at establishing the patterns in the current discourse on nutrition literacy, highlighting the critical role of the individuals. This chapter is focussed on the following specific domains: nutritional overview of the restaurant industry, nutrition information seeking, nutrition knowledge, levels of nutrition literacy, and nutrition knowledge application.

Nutritional Overview of the Restaurant Industry

It is undeniable that today's eating-out trend is different from what it used to be years ago. It has evolved from an occasional treat to a necessity, which has formed part of the daily routine of most people. The provision of food has become very competitive, with restaurants standing out to satisfy the many customers who eat out. However, along with the frequency of eating out is a decline in the overall nutritional quality of the diet (Kwon & Ju, 2014), which makes the nutrition expertise of food providers very vital to the continuing effort to provide nutritious menu items.

Studies, in the past, have shown that some chefs believed that they have the right attitude and are practicing healthful food preparation (Middleton, 2000; Rouslin & Viera, 1998). Other studies have also revealed that although chefs were practicing healthful food preparation techniques, the factors of time, taste and training still pose barriers (Reichler & Dalton, 1998). The relationship

between nutrition and wellness has been well established in the literature (Friesen, Altman & Kain, 2002). Furthermore, it is firmly established that eating out of home has a great impact on overall health of consumers, which makes it even more critical for food providers to become nutrition literates. Growing interest in nutrition and wellness, and at the same time an increase in the number of people eating away from home has prompted food providers to respond to the nutrition call.

According to the National Restaurant Association (NRA), the domains of dietitians and chefs have increasingly intersected giving birth to a new phrase known as “cheftitians” (NRA, 2017). This has been driven primarily by the shifts in nutritional regulations, flavour trends and consumer demands (NRA, 2017). Now, chefs are working closely together with dietitians to fulfil customers’ need for nutritious menu items.

Nutrition Literacy and Communication Intervention

Communication intervention in nutrition or health literacy studies has gained significant attention over the past two decades (Benoit & Strathman, 2004; De Almeida et al, 1997; Ishikawa et al., 2008b; McKay et al., 2006; Ndahur, 2012; Szwajcer; Hiddink, Koelen & Woerlum, 2005; Zoellner et al., 2009). Empirical research on nutrition information communication has been informative over the period. The shift from nutrition education to nutrition communication as an intervention strategy has influenced the scope of accessibility to nutrition messages by intended users. Communication in advancing nutrition literacy has the potential of subtly persuading individuals

to pick up credible nutrition information, which subsequently influences their behaviour.

Similarly, as part of public health literacy intervention, health communication has been observed as an effective tool in reducing the barriers to the appreciation of health-related issues, as well as playing an important role in building the skills needed to improve overall health literacy levels (Song, 2014). Health information is communicated using culturally relevant messages, relevant messages, materials, and activities that reflect the language capability and preferences of target audience (Song, 2014).

Nutrition information is easily accessible through a variety of sources (Charlton, Brewitt & Bourne, 2004; Laberge, 2016; McKay et al., 2006) including: non-print (television, family and friends, doctors or other health care providers) and print (magazines or newspapers) sources. The conventional sources include registered dietitians, and medical practitioners. Nonetheless, other complementary sources are becoming more popular with the increase in media reports and dissemination of information through the internet, (Ishikawa, et al., 2008b; Laberge, 2016; Van Dillen, 2004). This phenomenon has made nutrition information widely accessible by many people. All these sources of information act as a chain of communication with the aim of informing and influencing behaviour (Marquis et al., 2005). Subsequently, the quality and quantity of information may be subject to change due to the variety of individuals intervening in the communication chain (Marquis et al., 2005; Rowe, 2002).

Individuals who seek nutrition information often pass the source through a cognitive process of validation. They usually prefer sources that are perceived

to be credible, easily accessible, reliable, and often provide expert, clear and detailed information on the topics of interest (Ball, Johnson, Desbrow, & Leveritt, 2013; Cash, Desbrow, Leveritt, & Ball, 2015; Marquis et al., 2005; Rowe, 2002; Van Dillen, Hiddink, Koelen, De Graaf, & Van Woerkum, 2004).

Health professionals are often regarded as credible sources of nutrition information because of their level of knowledge on the subject and trustworthiness (Benoit & Strathman, 2004; De Almeida et al, 1997; Szwajcer et al., 2005). They are perceived as experts who provide objective perspectives on issues related to nutrition and health. Studies on nutrition literacy have reported a significant association with media use for nutrition information (Kutner, Greenberg, Jin, & Paulsen, 2006; Ndahura, 2012; Zoellner et al., 2009) and level of trust from nutrition sources (Ndahura, 2012; Zoellner et al., 2009).

Sources of Nutrition-related Information

In order to promote good nutrition, it is necessary to identify the sources from which individuals seek nutrition information and the extent to which reliable sources are used (Holgado et al., 2000). Silk et al. (2008) suggested that sending nutrition information through effective channels is an important issue in the promotion of good health. This is important because individuals have their preferred sources that they contact for nutrition information (Silk et al., 2008).

A study conducted by Zoellner et al. (2009) among adults in the Lower Mississippi Delta revealed that television is a more appropriate media channel for disseminating health and nutrition information among the population

studied. Also, television viewing was observed to be 4 times preferred than the internet and was deemed a more trusted source of nutrition information.

Similarly, a study that focussed on elderly Japanese people reported that about 80 percent of their respondents studied received diet and nutritional information from television, whereas 58 percent received this information from newspapers (Aihara & Minai, 2011). Yet, another study focussing on black urban South African women revealed radio and television as the most frequently encountered sources of nutrition information, followed by family/friends, and with only 48.5 percent choosing health professionals (Charlton et al., 2004). Furthermore, Kutner et al.'s (2006) NAAL study earlier reported that, compared with adults who had higher health literacy, those with lower health literacy received less information about health from written sources, as well as the internet.

On the other hand, Ndahura's (2012) study noted that adolescents preferred books and newspapers as sources of information about nutrition, diet or food to ten other potential sources. Hitherto, a study by Ybarra, Emenyonu, Nansera, Kiwanuka, and Bangsberg (2008) found that majority of adolescents in Mbarara district in Uganda sought health information from their parents, teachers and other adults, followed by books/library, siblings and friends, and the internet.

The preference for health professionals as a conventional source of nutrition information is equally evident in the literature on sources of nutrition information. For instance, the study by Hiddink et al. (1997) found that consumers selected family doctors as a source of nutrition information over ten other potential sources.

More specifically, some differences and similarities in the preference of nutrition information sources were found on the basis of socio-demographic characteristics of level of education and gender. With regard to level of education, McKay et al. (2006) found that irrespective of the level of education, individuals still relied heavily on print media sources, and that older adults preferred their health information in written form. Besides, the same study also found that participants relied on doctors as much as they do with the newspaper.

With respect to gender differences, there have been some contradictory findings in the literature. The study by McKay et al. (2006) reported a significant difference between sex groups and friends as a source of nutrition information. The study found that females reported relying on friends more often than males. On the contrary, Aihara and Minai (2011) indicated that men were more likely to rely on their friends for dietary information, whereas women were more likely to rely on health professionals for information.

Although both studies were based on adults, the studies were conducted in different settings accounting for the differences in the sex groups. McKay et al. (2006) was conducted in Boston, USA while Aihara and Minai's (2011) study was situated in Japan. According to Takahashi et al. cited in McKay et al. (2006), in the Japanese society, old men tend to withdraw from social activities after retirement which possibly explains their reliance on friends for dietary information.

Level of Trust in Nutrition Information Sources

Trust is built from presenting balanced information from credible sources, and from communicating these in ways that the general population

could comprehend. This goes without mention of the fact that some sources are trusted by information users more than other sources.

A pan-European study on nutrition information sources indicated that there is a general agreement about the source of information on healthy eating that people mainly use and trust, that is: the health professionals (De Almeida et al., 1997). Similar findings were made by Zoellner et al. (2009) that largely, participants trusted information from doctors or health care providers and television the most and from the internet the least. Additionally, people in the lowest nutrition literacy category possessed lower trust in magazines, newspapers, and radio than did those with adequate nutrition literacy skills. However, in the same study, no trust differences were established among nutrition literacy categories for trust in health care providers, television, family or friends, and the internet.

Another study revealed that majority of the adolescent students very strongly agreed that they trusted in nutrition information communicated by international organisations such as the WHO (Ndahura, 2012). The study also indicated that the participants very strongly trusted nutrition information from a nutritionist or dietician, health personnel such as doctor or nurse, government health agency and the internet. Friends were observed as the least trusted source of nutrition information. Further, the study established a significant difference between the male and female adolescent students in trust in nutrition information from nutritionists or dieticians, the internet, television and radio with the male adolescent students having a higher mean value in all the four sources.

Similar findings were reported by Marquis et al. (2005) that a large percentage of participants studied were very confident about nutrition information from health professionals such as dietitians, physicians and nurses, as well as information from the government. In the same study, it was also observed that the respondents had high level of confidence in nutrition information received from the internet, magazines, and books.

Furthermore, almost all the participants in the study of Charlton et al. (2004) indicated that they trusted health professionals a lot. In addition, most of the participants placed a lot of trust in the television and the radio, whereas the written media was regarded as less trustworthy. However, an interesting twist to most of these findings (Cash et al., 2015; Charlton et al., 2004; Marquis et al., 2005; Ndahura, 2012) is the discrepancy between the frequency of access to sources of nutrition information and the reported degree of trust placed in the various sources as reported by the authors. For instance, in the case of Charlton et al. (2004), only 48.5 percent of participants indicated that they had received nutrition information from health professionals; yet, they trusted this source a lot. Marquis et al. (2005) maintained that the sources most often consulted by individuals for nutrition information are not necessarily those perceived as most credible.

The literature has successfully teased out the fact that the trusted source for most audience is medical practitioners because of their inherent expertise. However, literature have successively pointed to the fact that the most trusted sources are not always the most utilised sources of information. Hence, information seekers do not necessarily consider only trusted sources, but their preferred ones.

Nutrition Literacy and Information Seeking

Information has been described by Marchionini (1995) as anything that can influence the knowledge of the seeker, which means that the seeker should have a purpose and that determines both the type of information to source and where to source such information. Marchionini (1995) further argued that information seeking is necessitated by the desire to resolve an information need.

Miller (2002) also articulated that information exists in magazines, television among others in a static and lifeless form. Individuals need to possess some skills to be able to successfully find the right information. They require skills to access and use information sources, understand information, and make decisions about what is relevant and apply it when necessary. To a large extent, these skills border around the ideas of literacy, and in the field of nutrition, called “nutrition literacy”. Nutrition information is complex and one’s ability to seek the right information increases one’s nutrition literacy. Therefore, the presence or absence of these skills may have a significant influence on the information-seeking process (Selber, 2004).

There have been attempts by some researchers to distinguish between seeking behaviours and scanning behaviours. In the study of cancer-related information-seeking behaviour, some researchers have defined scanning behaviours as passive or casual exposure to information (Niederdeppe et al., 2007; Shim, Kelly & Hornik, 2006). On the other hand, the same authors also defined seeking behaviour as actively searching for particular information.

Within the context of nutrition, Zoellner et al. (2009) defined seeking as an active and purposeful effort to obtain nutrition information. Their study revealed a clear association between nutrition-seeking behaviours and nutrition

literacy; hence, nutrition information-seeking increases as nutrition literacy skills increase. Given the fact that seeking is an important element of nutrition literacy, Zoellner et al.'s (2009) definition of information seeking is adopted for this study.

Zoellner and Carr (2009) identified the capacity to obtain basic nutrition information as the first element of nutrition literacy. The findings of the various researches on nutrition information seeking vary; however, the main results can be grouped under confidence, and socio-demographic characteristics. A myriad of empirical studies provides clear findings that point to the influence of these variables on information seeking and nutrition literacy at large.

Confidence in Seeking Nutrition-related Information

Drawing on the findings by Ha and Jung Lee (2011), Ndahura (2012) and Zoellner (2009), it could be concluded that individuals who are confident in seeking nutrition information are likely to be more knowledgeable and confidently take good decisions when handling their tasks. Confidence in seeking nutrition-related information has been identified as one of the factors influencing nutrition literacy.

Individuals who are highly confident in seeking health information are more likely to be knowledgeable about nutrition and health, and to be engaged in healthy behaviours. For instance, Ha and Jung Lee's (2011) results indicated that an individual's confidence in seeking health information significantly predicted his or her knowledge about cancer prevention and healthcare behaviour. On the other hand, Ndahura's (2012) study of adolescents in Kampala revealed that only a quarter of the adolescents were completely

confident that they could acquire nutrition-related advice or information when it became necessary. However, on average the adolescents were only somewhat confident that when they needed nutrition-related advice or information, they could get it.

Ha and Jung Lee (2011) also opined that self-confidence in seeking health information seems to be associated with an individual's health literacy and trust in information sources, especially health professionals, family, friends and the internet. Similarly, Zoellner et al.'s (2009) study found a link between self-confidence in getting nutrition advice or information and nutrition literacy status. In their study, they indicated that people with lower nutrition literacy reported less confidence in getting information about nutrition.

Barriers to Nutrition Literacy

Barriers to nutrition literacy have received somewhat low consideration over the past decade (Aihara & Minai, 2011; Ndahura, 2012; Zoellner et al., 2009; Zoellner & Carr, 2009). Researchers have suggested that in an attempt to improve nutrition literacy, the barriers that hinder information access need to be addressed first (Ndahura, 2012; Zoellner & Carr, 2009). Barriers to information acquisition are obstacles that limit an individual's ability to access appropriate nutrition information from reliable source. These limitations of nutrition information sources are likely to impact individuals differently depending on personal factors such as age, educational background and other (Cash et al., 2015).

Zoellner et al. (2009) measured barriers to seeking information about nutrition, food or diet using four statements (i.e., it took a lot of effort to get the

information you needed; you felt frustrated during your search; you were concerned about the quality; and the information you found was too hard to understand). Participants were asked to indicate their level of agreement to the statements. Overall ratings for barriers to seeking nutrition information were relatively neutral (neither agree nor disagree), and the multivariate analysis of covariance model for barriers was not significant.

Another study conducted by Zoellner and Carr (2009) using the same statements to examine perceived barriers regarding nutrition information among school nutrition managers revealed an overall scale mean of 3.33 (neutral) and individual statements being between neutral and somewhat agree. According to Zoellner and Carr (2009), if school nutrition managers are somewhat frustrated during their search for nutrition information; somewhat concerned about the quality of the nutrition information; and feeling like identifying the information takes a lot of effort and that the information is difficult to understand, then these barriers to obtaining nutrition information must be addressed.

Similarly, in order to examine barriers to seeking nutrition information, Ndahura (2012) adapted questions from Zoellner et al.'s (2009) study. The findings indicated that most of the adolescent students strongly agreed that nutrition information was difficult to understand. Also, the lack of nutrition, diet or food information in other languages apart from English emerged as the major barrier. Another significant barrier cited by the adolescent students was the financial cost associated with relying on the internet as an information source.

Even though researchers have found that individuals may be inhibited in the search effort by their perceived barriers, other factors could exacerbate the search for nutrition information. For example, a study on barriers and

catalyst of nutrition literacy among elderly Japanese people found low education level, low economic status, the presence of cognitive difficulty and visual and hearing impairment as barriers of nutrition literacy among elderly people (Aihara & Minai, 2011). Likewise, the study by Zoellner et al. (2009) reported that people with lower nutrition literacy rated barriers to seeking nutrition information as higher than did those with adequate nutrition literacy.

Regarding sex as a socio-demographic characteristic and barriers to seeking nutrition information, researchers have not established any significant relationships. For instance, Ndahura's (2012) study found no significant difference between the male and female adolescent students regarding the barriers to seeking nutrition information, which suggests that they are probably faced with similar barriers when they seek information about nutrition.

In sum, over the past decade researchers have stressed the need to examine barriers as the first construct in order to improve on nutrition literacy among individuals. The findings point to perceived barriers as the main barriers examined by most researchers. Also, low educational level has the potential of exacerbating the barriers faced by individuals when seeking nutrition information. Lastly, no research has been able to establish a link between sex and barriers to seeking nutrition information.

Measuring Nutrition Literacy

The focus of empirical research on health literacy has extended to embrace the domain of nutrition. Research in health literacy is a growing field and a general understanding of health literacy principally aids in the broader discussion of nutrition literacy. Currently, the connection between the two

domains is very well-defined, with some of the nutrition-related health literacy studies establishing strong relationships between health literacy skills and certain skills such as estimation of portion sizes, and understanding of nutrition labels (Carbone & Zoellner, 2012; Gibbs & Chapman-Novakofski, 2012; Rothman et al., 2006) and seeking of and trust in nutrition information channels (Zoellner et al., 2009).

Some researchers consider health literacy to be one-dimensional mainly focussing on individual capabilities (Ndahura, 2012). Instead, others have extended the concept of health literacy to include aspects which go beyond individual capabilities (Ndahura, 2012; Nutbeam, 2000; Zarcadoolas, Pleasant & Greer, 2005). This lack of agreement about the fundamental understanding and measurement of health literacy limits the possibilities for comparison of findings from different settings (Mårtensson & Hensing, 2012; Sørensen et al., 2012).

Nonetheless, researchers have contributed to the conceptualisation and measurement of both health and nutrition literacy through the various empirical studies reviewed in this study. Health literacy scholars over the past two decades have developed good measures of individual reading capacities, despite the difficulties in measuring reading demands comprehensively (Baker, 2006). Measures of individuals' capacities are perhaps accurate proxies for their health-related literacy (Baker, 2006).

McCormack et al. (2010) observed that the most frequently used measures of health literacy are the Rapid Estimate of Adult Literacy in Medicine (REALM) and the Test of Functional Health Literacy in Adults (TOFHLA). Although these measures are not comprehensive assessments of an individual's

capacity, the REALM (Davis et al., 1993) and the TOFHLA (Baker, Williams, Parker, Gazamararian & Nurss, 1999; Parker, Baker, Williams, & Nurss, 1995), are the most widely used measures of health literacy. These tests rely on some selected domains that are believed to be indicators to measure individual's overall capacity (Baker, 2006; Nutbeam, 2009).

The REALM is a 66-item test that measures the domain of vocabulary by assessing word recognition and pronunciation (Baker, 2006). The other most widely used measure (TOFHLA) consists of a reading comprehension section (a 50-item test using the modified Cloze procedure) to measure prose literacy and a numeracy part with 17 items that assesses an individual's capability to read and understand hospital documents and labelled prescription (Baker, 2006).

Other measures used to assess health literacy include the Newest Vital Signs (NVS), National Adult Literacy Survey (NALS), Health Activities Literacy Scale (HALS), Health Literacy Skills Instrument (HLSI) and the Wide Range Achievement Test-Revised 3 [WRAT-R3] (Ndahura, 2012). The NALS contains some health-related questions, which have been compiled to create the HALS. The HALS includes prose, quantitative, and document items in 5 health-related areas. Like other instruments, HLSI developed by McCormack et al. (2010) measures print literacy predominantly but can also be applied in studies that examine oral and internet-based information seeking skills. Regarding content domains, the HLSI reflects health related issues across the life course for healthy promotion and disease prevention, health care maintenance and treatment, and health navigation (McCormack et al., 2010). The 25-item instrument demonstrated good internal consistency (Cronbach's $\alpha = 0.86$).

Measurement of Nutrition Literacy Status

To determine the nutrition literacy status of individuals, some form of assessment should be undertaken. Accordingly, there is a possibility that no single instrument could measure all aspects of the construct (Diamond, 2007) due to its complexity. Studies that have been done relating literacy to the health or nutrition status of an individual have employed either a previously validated scale or developed new scales based on the study context. In most cases, nutrition literacy status has been established using the total count of correct responses provided by respondents. Conclusions are drawn based on the categorisation of the scale – low, limited, adequate literacy.

Diamond (2007) indicated that research that relates literacy to health status of an individual has often excluded measures of nutrition literacy. To fill the research gap, Diamond developed a measure of nutritional literacy known as the Nutritional Literacy Scale (NLS) in adults that is proposed to measure individuals' capacity to understand nutrition information. The NLS employs the Cloze Procedure, in which one or more words are omitted from a sentence. Each sentence includes four different options, among which participants choose the appropriate answer. The instrument has 28 questions with content areas such as organic foods, calcium, fibre, disease, sugar, among others. The degree of nutrition literacy is categorized as follows: poor (0-7 right questions), marginal (8-14 right questions) and adequate (15-28 right questions).

To assess the internal consistency and construct validity, the scores of the NLS was compared to those of the reading comprehension section of the Short Test of Functional Health Literacy in Adults (S-TOFHLA) in a cross-sectional study of 341 adult patients from two primary health care practices.

The NLS scores indicated acceptable internal consistency (Cronbach's $\alpha = 0.84$) and correlated with S-TOFHLA ($r = 0.61$), thus supporting evidence of construct validity (Diamond, 2007). Only 2 percent of the participants scored in the inadequate range, 5 percent in the marginal and 93 percent in the adequate (Diamond, 2007).

The Newest Vital Sign (NVS) which is a validated scale developed by Weiss et al. (2005) has been explored by several researchers to measure nutrition literacy skills. Some nutrition professionals and researchers prefer this scale because it requires nutrition label reading. However, it should be noted that although the NVS utilizes a food label in its assessment, it does not measure comprehensive nutrition literacy (Gibbs, 2012). This motivated Diamond (2007) to develop a measure of nutritional literacy known as the NLS, which has been discussed in the preceding paragraphs.

With this scale, respondents view information on an ice cream nutrition information label and then answer 6 questions about how they would interpret and act on the information provided on the label. The number of correct responses is summed to produce a nutrition literacy score ranging from 0 to 6. Respondents with a score of 1 or below indicates a high likelihood of limited literacy. Two to 3 correct responses indicate the possibility of limited literacy, whereas respondents with scores of 4 to 6 are understood as having adequate literacy skills. The NVS requires only three minutes to be administered, is reliable (Cronbach's $\alpha = 0.69$), correlates with the TOFHLA ($r = 0.49, p < 0.001$) and is available in English and Spanish (Weiss et al., 2005).

In 2012, Gibbs also contributed to the discourse on nutrition literacy assessment by developing the Nutrition Literacy Assessment Instrument

(NLAI). Gibbs critiqued the REALM, TOFHLA, and NVS as not providing an understanding of additional knowledge or skills specific to nutrition, thereby developing the NLAI. The NLAI comprises three sections. The first section includes the Nutrition Literacy Assessment Algorithm that assesses the skills or knowledge present in the client that is important for the intended educational message. Based on the findings generated from the first section, the corresponding components in the other sections of the NLAI is completed.

The second section of the NLAI is divided into assessments of five different knowledge/skill sets identified: “Nutrition and Health”, “Macronutrient”, “Household Food Measurement”, “Food Label and Numeracy”, and “Food Groups”. The instrument was found to be content-valid as a measure of nutrition literacy by the level of agreement reached for all sections of the instrument (Gibbs, 2012). Agreement for inclusion of all sections of the instrument was reached including the Algorithm (81.8%), “Nutrition and Health” (80.9%), “Macronutrients” (87.1%), “Household Food Measurement” (94.5%), and “Food Groups” (90.7%).

Gibbs & Chapman-Novakofski (2013) further studied and tested content validity for the NLAI among registered dietitians toward nutrition literacy. The study found good agreement (89.7%) for including each section of the NLAI. All sections accomplished their purpose.

Zoeilner et al. (2009) examined literacy status of adults in the Lower Mississippi Delta by adopting the Newest Vital Sign (NVS). With a sample of 177 adults, the scores indicated 42 (24%) participants had a high likelihood of limited literacy skills (0-1 correct answers), 50 (28%) has a possibility of limited

literacy skills (2-3 correct answers), and 85 (48%) had adequate literacy skills (4-6 correct answers).

In the same vein, Zoellner and Carr (2009) measured nutrition literacy skills using an adapted version of the NVS (5 questions) and found that majority of the participants (537) representing 72.2 percent had adequate nutrition literacy skills, 145 (19.5%) had limited nutrition literacy, and 61 (8.2%) had low nutrition literacy. The study was based on a sample of 728 school nutrition managers.

Song (2014) assessed influence of nutrition literacy on dietary behaviour among 171 college students in United States. Nutrition literacy was assessed based on selected question from the NLA. The study found that only 1.8 percent (n=3) of the participants have marginal nutrition literacy, with majority of the participants (98.2%, n=168) having adequate nutrition literacy.

Furthermore, Sampaio et al.'s (2014) study assessed nutrition literacy using the NVS and NLS. The scales were translated to Portuguese and administered on 38 employees of primary health care in Brazil. The scales were administered one after the other randomly, without breaks between them. For easy analysis and interpretation, Sampaio et al. (2014) categorised the scale into inadequate (0 to 14 questions) and adequate literacy (15 to 28 questions). The results indicated that 68.4 percent (NVS) and 5.3 percent (NLS) had inadequate nutrition literacy. For the NVS, there was no statistical difference between gender, educational status and nutrition literacy. Unlike the NVS, there was statistical difference between educational level and nutrition literacy for the NLS but not for gender. The study, therefore, concluded that the two

instruments could not be substituted when measuring nutrition literacy. The choice of instrument should be based on the purpose and context.

On the other hand, the study conducted by Aihara and Minai (2011) was not based on any existing validated scale. Nutrition literacy was assessed in terms of the ability to obtain basic diet information, specifically the participant's knowledge of the contents of the 'Japanese Food Guide Spinning Top', and the 'Dietary Guidelines for Japanese'. Literacy was measured by 'I do know (1 point)' or 'I do not know (0 point)'. The aggregate score of nutrition literacy ranged from 0 to 10 and the scale is reliable (Cronbach's $\alpha = 0.86$). After analysis of the data, nutrition literacy was divided into adequate nutrition literacy (literacy score=10) and limited nutrition literacy (literacy score <10) because the data did not show normal distribution. The results indicated that about 30 percent of the participants had adequate nutrition literacy.

Another important dimension of nutrition literacy research works has to do with the variations of literacy scores across several socio-demographic variables. Several research findings (Aihara & Minai, 2011; Campos et al., 2011; Miller, DeWitt, McCleary, & O'Keefe, 2009; Zoellner et al., 2009; Zoellner & Carr, 2009) have reported significant variations of nutrition literacy scores by socio-demographic characteristics of participants. These findings have linked the socio-demographic variables to the literacy status. A synthesis of the findings reveals several socio-demographic variables such as income level and educational achievement, race, sex, age, ethnicity, body mass index, years of experience at current position, level of confidence, first language at home, hours of in-service training for nutrition requirement, household type, social support, social network, cognitive functions and sensory impairments.

Even though these studies found some associations between socio-demographic characteristics and literacy scores, there are no exclusive established patterns. For instance, Zoellner et al. (2009) established a significant relationship between educational attainment and income level, and nutrition literacy scores. Similarly, Campos et al.'s (2011) study found that the number of label use are higher in younger participants and among those with higher education levels, and frequent label use was associated with better understanding in general.

Although Zoellner et al.'s (2009) study did not establish any difference between race, age or sex and nutrition literacy categories, the NAAL study indicated that blacks have lower average health literacy than whites (Kutner et al., 2006). In addition, the NAAL study also indicated that adults aged 65 or older have lower average health literacy than younger age groups, and the average health literacy scores for men are lower than those for women. Contrary, Aihara and Minai's (2011) study based on participants aged ≥ 75 years found that more men had limited nutrition literacy than did women.

Further, nutrition literacy scores varied significantly by the years worked in current position. For Zoellner and Carr (2009), they found that elementary school nutrition managers working in their current position for greater than 20 years had lower nutrition literacy status, as compared to those working in other types of schools and those in their current position greater than 20 years.

To a large extent, the study setting determined the number of socio-demographic variables considered in each study. In some of the studies (Zoellner et al., 2009), the variables considered included sex, age, body mass

index, income level, educational achievement, and race while in others (Zoellner & Carr, 2009), the list of variables expanded to include: first language at home, the number of years worked in current position, hours of in-service training for nutrition requirement. Aihara and Minai (2011) explored other variables such as household type, social support, social network, cognitive functions and sensory impairments in their study of elderly Japanese people.

Reviewing these studies, it is worth noting that the context of the study in relation to the study populations is relevant in deciding which socio-demographic variables to include in nutrition literacy studies. Nonetheless, in all cases, these studies established some association between socio-demographic characteristics of participants and nutrition literacy status.

Measurement of Levels of Nutrition Literacy

As mentioned earlier, some scholars have extended the concept of health literacy to include aspects which go beyond individual capabilities. For example, Nutbeam (2000) and Ishikawa et al. (2008b) identified three levels of health and nutrition literacy respectively: functional, interactive and critical nutrition literacy. Although an individual can function well in a society with only one level of nutrition literacy, it is imperative that they also strive to achieve the top level to be able to exercise greater autonomy and empowerment (St Leger, 2001) given changing nutrition situations. Health and nutrition literacy can be measured at the three hierarchical levels.

Ishikawa et al. (2008b) developed and examined the psychometric properties of a scale designed to measure the three levels of health literacy, based on Nutbeam's (2000) model, in diabetic patients. Five items were used to

assess the functional literacy of the patients (extent to which the patients had trouble in reading the instructions or leaflets from hospital or pharmacies). For communicative health literacy, five items were used to assess how the patients extracted and communicated diabetes-related information. Critical health literacy (degree to which the patients critically analysed the information and its use in decision making) was assessed using four items. The internal consistency values of the functional, communicative and critical health literacy scales were adequate ($\alpha = 0.84$, $\alpha = 0.77$, and $\alpha = 0.65$ respectively). The scales were also moderately correlated to each other, thus represented a different domain of health literacy abilities and skills.

Another study focussing on Japanese office workers examined the psychometric properties of a brief test to assess major components of communicative (interactive) and critical health literacy (Ishikawa et al., 2008a). Their findings supported the validity of the health literacy scale among office workers.

Another interesting dimension of the empirical literature is the expansion of Nutbeam's (2000) hierarchical model. Kjøllesdal (2009) conducted a study with the aim of developing and testing the questionnaire (Nutrition Literacy Questionnaire [NLQ]), which attempts to measure levels of nutrition literacy. The NLQ comprised two main parts; (1) the NLS (Diamond, 2007) and (2) statement items aimed at forming constructs which would reflect the theory of Nutbeam (2000), claiming an existence of three hierarchical levels of health literacy. Through the analysis four constructs were developed; *FNL*, *INL*, *CNL* *action* (ability to engage beyond the individual needs, e.g. political, community, family, with the goal of others to get a better diet) and

CNLscientific (ability to critically assess and evaluate nutrition information from various sources based on scientific criteria). The study also reported several demographic variables contributing significantly to the total variance in the construct variables.

Ndahura (2012) also measured nutrition literacy among adolescent students in Kampala based on Pettersen et al.'s (2009) model and Zoellner et al.'s (2009) study. Seven constructs were developed through exploratory factor analysis: functional nutrition literacy (*FNL*), *interactive nutrition literacy (INL)*, *INLdiscuss (INLdiscuss)*, *CNLaction*, *CNLmedia*, *CNLinfluence* and a *Grand NL*. The average scores indicated the students had moderate levels of *FNL*, *INL*, *INLdiscuss (INLdiscuss)*, *CNLaction*, and *Grand NL* but low levels of *CNLmedia*, *CNLinfluence*. The findings also indicated a significant difference in mean nutrition literacy scores of the *INLdiscuss* and *CNLaction* constructs between the male and female adolescent students.

Dalane's study, as cited in Ndahura (2012), assessed nursing students' nutrition knowledge, level of interactive nutrition literacy and critical nutrition literacy, and their ability to request information from a scientific news brief. The study instrument consisted of a nutrition knowledge test, a scientific news brief, and interactive nutrition literacy and critical nutrition literacy reflecting statements. The study found that the students had a modest level of nutrition knowledge; their ability to request information from the scientific news brief was poor and semi-confirmatory factor analysis revealed three constructs of: *INL*, *CNLaction* and *CNLscientific*.

Given the above issues discussed with respect to the measurement of nutrition literacy, all studies assessing nutrition or health literacy with screening

questions or short tests have compared an instrument with a gold standard such as TOFHLA or the REALM (Baker, 2006). For nutrition literacy, the two commonly used scales are the NLS and NVS. Also, studies that have explored the degree of nutrition literacy have attempted to validate the theory of Nutbeam (2000) and Pettersen et al. (2009) claiming an existence of three hierarchical levels of health literacy and nutrition literacy respectively.

In addition, irrespective of the findings on the degree of nutrition literacy, the studies so far conducted indicate that the findings reported are not conclusive and still in the infancy stage. As such, further research is needed to extend the understanding of the nutrition literacy domains. Nonetheless, research findings have clarified key areas that future research needs to focus attention on. Further research needs to clarify the constructs that can be developed out of the three levels of literacy as well as the demographic variables that contribute significantly to the total variance in the construct variables.

Nutrition Literacy-Nutrition Knowledge-Nutrition Action Nexus

Categorically, literacy differs from knowledge in two ways. First, knowledge can be termed as a subset or an outcome of literacy processes. Knowledge is perceived or acquired when an individual successfully extracts and makes meaning out of available information. Second, there is a bi-directional relationship between literacy and knowledge. Thus, an individual needs literacy skill to seek and acquire knowledge. On the other hand, the level of knowledge of a topic can motivate an individual to seek more information employing literacy skills. Literacy has become a very critical subject of interest to researchers and practitioners. This is because even the basic form (reading

and writing skills) enables individuals to advance their knowledge and improve their potential to achieve personal ambitions and take action to benefit the society both economically and socially (Nutbeam, 2009).

According to Holgado et al. (2000, p.185), “in spite of the limitation of the KAP model, adequate knowledge about nutrition practices is, of course, a prerequisite to adopting good nutrition”. Researchers have alluded to the fact that even with adequate nutrition literacy, individuals might not be able to put their knowledge into use. Several reasons have emerged from research explaining why this divergence persists.

In a study that examined nutrition literacy and knowledge among school nutrition manager, respondents felt strongly that they played an important role in school wellness; however, the mean confidence for making nutrition-related decisions was notably lower (Zoellner & Carr, 2009). These findings suggest that school nutrition managers may wish to contribute positively to school wellness programs but may lack the training and confidence to play that role (Zoellner & Carr, 2009).

Also, Marquart, Pham, Lautenschlager, Croy, and Sobal, (2006) assessed beliefs about whole-grain food. The results of this study showed that food and nutrition professionals provided more differentiated responses, whereas Women, Infants, and Children (WIC) state fair participants had fewer and less-elaborate responses. The scores for nutrition literacy assessment indicated that majority of the participants had adequate nutrition literacy and the rest possessed marginal nutrition literacy. However, in the same study, researchers found that most respondents were aware of the term “whole-grain foods”, but less often reported that they use the term. The findings imply that,

even with adequate nutrition literacy, individuals might not be able to put their knowledge into use.

Another study investigating patient understanding of food labels (Rothman et al., 2006) reported that on average, participants answered 69 percent of the food-label questions correctly demonstrating deficits in understanding nutrition labels. Literacy was measured with the REALM, and WRAT-3. The findings also indicated that higher comprehension of food labels was significantly correlated (all p values were less than 0.001) with higher income ($\rho=0.39$), education ($\rho=0.49$), literacy ($\rho=0.52$), and numeracy ($\rho=0.67$). Though poor label comprehension was highly correlated with low-level literacy and numeracy skills, in some of the cases, people with higher education may still have difficulty interpreting current nutrition labels (Rothman et al., 2006).

However, to a large extent there seems to be some level of intersection between literacy and knowledge assessment in the literature. For instance, some authors (Zoellner & Carr, 2009; Zoellner et al., 2009) have not been clear on the use of the terms. This is as a result of the nature of instrument used in the assessment. Specifically, in studies that have employed the NVS, nutrition literacy is explored by examining respondent's nutrition label reading abilities. Although the NVS utilizes a food label in its assessment, it does not measure comprehensive nutrition literacy (Gibbs, 2012).

Furthermore, a wide range of factors influence dietary behaviours exhibited either at the domestic or commercial levels. Though many researchers have failed to find strong relationships between nutrition knowledge and specific nutrition behaviours, there have also been some prominent studies

(albeit low) that have provided evidence to support the existence of some relationship. Individuals with high levels of nutrition knowledge have been found to exhibit healthy eating behaviours.

A study by Wardle, Parmenter and Waller (2000) found a significant relationship between nutrition knowledge and healthy eating among 18 to 75-year-old General Practitioners selected from England. Wardle et al. (2000) found out that nutrition knowledge was significantly associated with fruit, vegetable and fat intake. In addition, knowledgeable individuals were found to be 25 times more likely to consume adequate amounts of fruits and vegetables daily. Nutrition knowledge was revealed to play a partial mediating role between respondents' socio-demographic and intake of fruit and vegetables.

Another study conducted in Australia (n=527) found that the association between socioeconomic position and maternal diet quality varied by nutrition knowledge level. Overall, nutrition knowledge was quite high among the respondents with low, medium or high socioeconomic positions (McLeod, Campbell, & Hesketh, 2011).

Regarding socio-demographic and economic variables, there is some evidence suggesting a relationship between sex, age, educational attainment and employment status of individuals and their knowledge levels (Hendrie, Coveney & Cox, 2008). For instance, through multiple regression analysis, Hendrie et al. (2008) established significant independent effects of gender, age, highest level of education and employment status on nutrition knowledge level. This was revealed to have accounted for 40 percent of the variance in nutrition knowledge scores.

Remarkably, Wardle et al. (2000) concluded by reiterating that interest in dietary issues could have played a role in the variations observed in the findings. An earlier investigation conducted by Chew and Palmer (1994) had revealed that interest in nutrition issues increases one's knowledge in nutrition. In a three-wave national survey, the authors revealed that a variation in nutrition interest, not education differences, was strongly associated with knowledge gain. They added that television programme viewing influenced interest in nutrition and subsequently increased nutrition knowledge.

Drawing on the findings from public health research, there is some evidence to suggest that nutrition knowledge has the potential to influence nutrition literacy and confidence in making nutrition decision. However, it is detrimental to lose sight of the fact that the assessment of nutrition knowledge in relation to behaviour is challenging particularly among closely related individuals (for example, in a restaurant kitchen). This is particularly so because knowledge forms part of the dynamic factors mediating their behaviours. Besides, these kitchen staff constantly model behaviours of their colleagues but express them either immediately or most often at a later date. Another difficulty is the fact that consumers of nutrition information translate that knowledge and use it often years later from when they absorbed the information (Morsley, 2002).

Chapter Summary

This chapter discussed some of the empirical issues related to nutrition literacy. First, the chapter presented a nutritional overview of the restaurant industry. Next, empirical studies on nutrition literacy as regards nutrition

communication intervention, information seeking, trust, confidence, barriers as well as the measurement of nutrition literacy were discussed in this chapter. The complexity of nutrition messages requires high cognition in processing the information for comprehension. However, the underlying enabling factor is the basic ability to read, write and interpret symbols. The chapter concluded with a discussion on the interconnection between nutrition literacy and knowledge application. The next chapter is dedicated to the methods employed in carrying out this research.



CHAPTER FOUR

RESEARCH METHODOLOGY

Introduction

This chapter discussed the research approach and methods employed in conducting the research. Specifically, the chapter described the study area, research philosophy and the research design. Other issues were the target population, sample size, sampling procedure, methods of data collection, research instrument and analysis techniques employed in the study.

Study Area

The study area was Ghana which is centrally located on the West African coast and has a total land area of 235,537 square kilometres. The Republic of Ghana is bordered by Togo, Burkina Faso, Ivory Coast and the Gulf of Guinea on the East, North, West and South respectively. Currently there are 16 administrative regions in Ghana, however at the time of data collection there were 10 regions, namely: Western, Central, Greater Accra, Volta, Eastern, Ashanti, Brong Ahafo, Northern, Upper East and Upper West. The 2010 population and housing census put Ghana's population at 24,658,823 million which represents an increase of 30.4 percent over the 2000 census population of 18,912,079 (Ghana Statistical Service [GSS], 2012). However, currently, according to the World Population Review (2019), Ghana's has an estimated population of 30.42 million.

In the last five decades, the proportion of the population living in urban areas has more than doubled, increasing from 23 percent in 1960 to 51 percent

in 2010 (GSS, Ghana Health Service [GHS], & ICF International, 2015). With regard to employment status, the 2014 Ghana Demographic and Health Survey (GDHS) report stated that some 73 percent of women and 82 percent of men within the age bracket of 15 to 49 years were employed in various occupations at the time of the survey (GSS, GHS, & ICF International, 2015).

Literacy rates in the country, according to the GDHS (2014) report, indicated that men had higher literacy level than women (82% and 67% respectively). Disaggregating by place of residence, the report revealed a wide gap in literacy rates between men and women. It was reported that more men residing in the urban areas were literate (91%) as compared with their rural counterparts (72%). Similarly, 78 percent of women in urban areas were found to be literate, compared with 54 percent in rural areas of Ghana.

The 2014 GDHS assessed respondent's exposure to the media (radio, television, or newspaper or magazine) at least once a week. The data showed that 52 percent of women and 78 percent of men aged 15-49 years listen to the radio at least once a week. In a similar vein, 51 percent of women and 66 percent of men watch television at least once a week. However, exposure to print media was much less common with 9 percent of women and 17 percent of men reported reading a newspaper or magazine at least once a week (GSS, GHS, & ICF International, 2015). Though the exposure was higher among men than women, it is worth noting that only some 31 percent of women and 14 percent of men aged 15-49 years were not exposed to any media source. This is important to the study because the figures suggest that more women and men irrespective of their place of residence are exposed to at least one media source.

The state is known to play a predominant role in addressing national issues such as educational needs, responding to famine by equipping farmers to increase production of certain crops and managing disaster (Ghartey, 2010). Regrettably, relative to education, the state has shown very weak commitment towards the issue of nutrition with most nutrition interventions being driven by donor institutions, such as Catholic Relief Services, World Vision and the World Bank (Ghartey, 2010). Yet, given the poverty rates in most part of rural Ghana, most policy elites are more concerned about food intake and not the nutritional value of the food.

On the flip side is the incidence of non-communicable diseases such as diabetes, hypertension and other diet related diseases which are troubling the urban dwellers in Ghana (Ghartey, 2010). The percentage of overweight/obese men and women was higher in the urban areas (23% for men and 49% for women respectively) and even highest among residents in Greater Accra (GSS, GHS, & ICF International, 2015). Incidentally, there was an incremental change observed in the proportion of overweight/obese men and women with wealth. Fortunately, the current discourse on nutrition is focussed on the promotion of regenerative health as a response to the current nutrition status of the country. However, there is little emphasis on the nutritional value of the food.

Anecdotal evidence suggests that whilst eating out is still considered a special occasional event for some Ghanaians, for others who are time pressed due to work demands and urban lifestyle, restaurant food has become a staple. This is evidenced by the growth rate observed in the formal sector catering establishment. The number of catering establishments increased from 364 to 558 in 2013 and 2017 respectively, implying that the demand for restaurants has

pushed supply to go up. The restaurant industry which comprises most of these catering establishments is, therefore, expected to respond actively to consumers interest in eating out by balancing the menu offerings to include healthful items.

Since the country is vast and the study was limited in terms of space and time, five regions were purposively selected to represent the country in this study (Figure 8). They include Greater Accra, Ashanti, Western, Northern, and Central regions of Ghana. Reasons for selecting the study areas included the following: foremost, these five regions are considered urbanised. The topic under study requires an urban setting and some literacy level, hence the purposive selection of these five regions. Nutrition literacy is considered an urban phenomenon/topic because it is closely tied to the necessary conditions for eating out and its relationship to health. Greater Accra and Ashanti regions have been considered the most urbanized regions in Ghana.

Next, these urban areas present an opportunity for interacting with RFPS who have attained the basic literacy level. The topic under study required the respondents to possess the ability to read and write to be included in the study. With the ability to read and write, it was assumed that they could search for and process nutrition information necessary to carry out their responsibilities in the kitchen.

Furthermore, the selection of these five regions was informed by the rate of exposure to mass media. The findings from the 2014 GDHS report showed a wide gap in exposure of mass media by place of residence (GSS, GHS, & ICF International, 2015). For instance, the proportion of respondents who watch television was notably higher among urban women and men (66%, 79%) than among their rural counterparts (34%, 50%). More specifically, women and men

residing in the Greater Accra and Central region were exposed to the radio, television and newspaper or magazine on weekly basis (11% and 24%; 4% and 8% respectively). This presupposes that the residents in these regions, including the other three selected for this study, are likely to receive nutrition messages channelled through these sources.

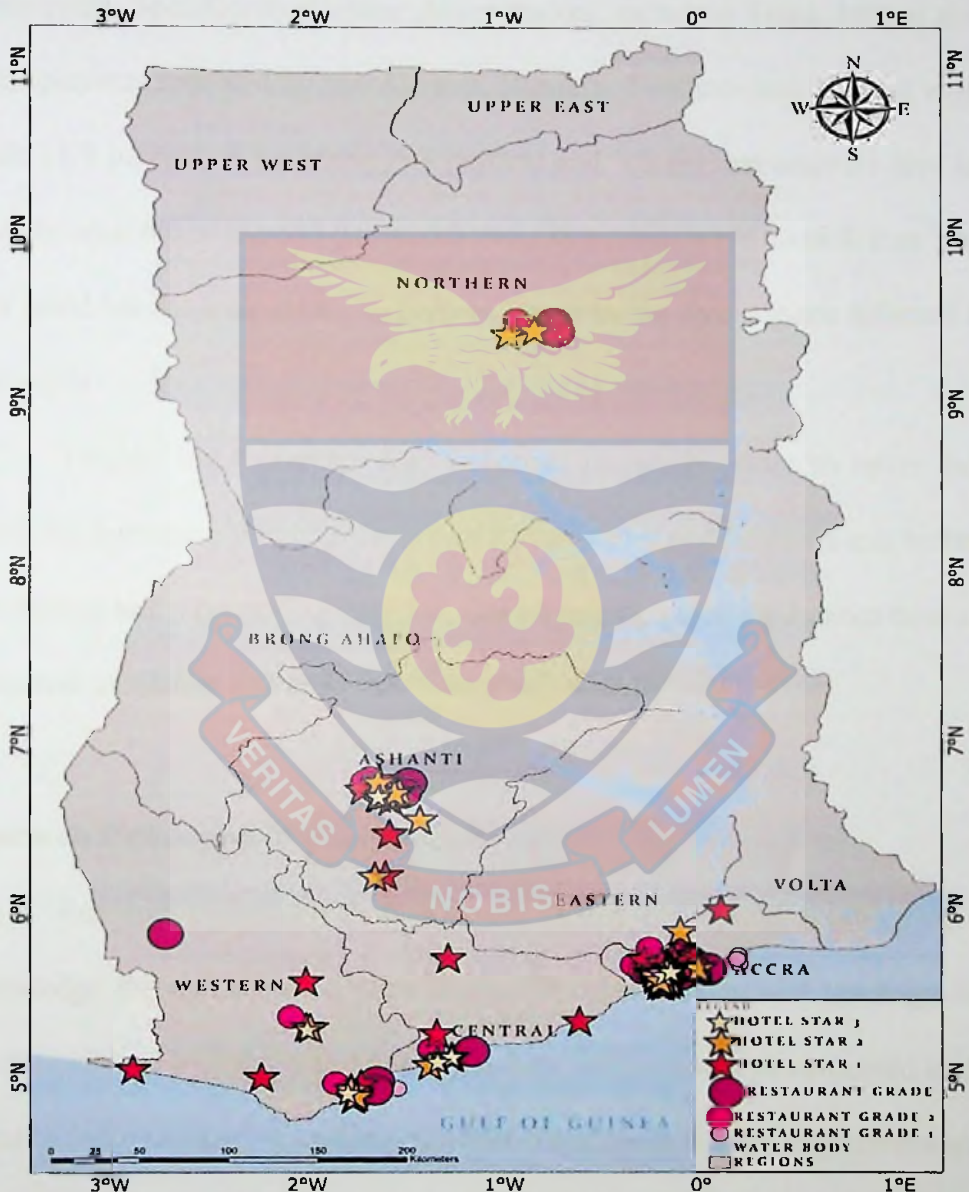


Figure 8: Map Showing Restaurants and Hotels in the Study Regions

Source: Cartography and Remote Sensing Unit of the Department of Geography and Regional Planning, University of Cape Coast (2018)

Additionally, these areas offer adequate number of licensed restaurants to examine the topic under investigation. The study focussed on only licensed independent restaurants and hotel restaurants. Specifically, as at the time of data collection, 427 restaurants had been licenced to operate in Ghana (GTA, 2017). Out of the 427, the five regions selected for this study accounted for 382 (89%) restaurants. Specifically, Greater Accra region, including Tema, hosted about 60.9 percent, followed by the Ashanti, Western, Northern and Central region with 11.9 percent, 7.3 percent, 6.3 percent and 3.0 percent respectively. In a similar vein, out of the 680 licensed hotels, 98 percent were classified as 1 to 3 star rated hotels, with about 77 percent found in the five regions selected for this study.

Finally, the researcher had to spread the study wider to cover more facilities, because collecting data from restaurateurs and hoteliers can be time consuming and a frustrating exercise. Consequently, given the limited time and resources available, this approach proved worthwhile.

Research Philosophy

Research philosophy centres on the source, nature and development of knowledge through research. The choice of epistemology and ontology has traditionally presented a major point of debate, and it is well documented in the social science research knowledge domain. The debate is often skewed towards the competitive choice between either the positivist or interpretivist research philosophy. Notwithstanding, none can lay claim to be the most preferred in the domain. Rather, the choice of research paradigm should be guided by the purpose for which the research is being conducted (Creswell, 2009). The present

advances in social science research, however, have increased the popularity of pragmatism philosophy.

Within the domain of social science research four main research philosophies have been identified, namely: positivism, interpretivism, realism and pragmatism (Creswell, 2012; Saunders, Lewis & Thornhill, 2016). This study was inclined towards the positivist standpoint. Positivism has been articulated as a philosophical perspective that argues for generalisation of findings. Thus, researchers who favour this philosophical standpoint are inclined towards only phenomena that could be observed objectively with the aim of gathering credible data (Saunders et al., 2016). Positivist philosophy seeks knowledge through the development and testing of hypotheses. These hypotheses are then confirmed, in whole or part, or refuted which could lead to the development of new theories, which are further tested (Saunders et al., 2016).

Another feature of the positivist approach to research worthy of note is that research is undertaken largely in a value-free way, without any iota of researchers' feelings and impressions. In other words, the researcher must try as much as possible to be external to the process of data collection and aim for complete freedom from the inclusion of their own values as researchers (Saunders et al., 2016). Positivism, therefore, resorts to the use of highly structured methodology to ensure reliability of findings. Emphasis is, therefore, placed on quantifiable observations that lend themselves to statistical analysis (Saunders et al., 2016).

The positivist philosophy is associated with the quantitative inquiry distinguishing it from the interpretivist standpoint which largely draws on

qualitative methods of inquiry. Consequently, the research philosophy adopted for the study was positivism. The use of positivism as the philosophical foundation of this study provided a perspective to the understanding of nutrition literacy and knowledge among RFPS. The philosophy was favoured because of the inherent advantage of generalisation of findings. In addition, other similar studies on nutrition literacy have adopted this philosophical viewpoint. Hence, for this study to be comparable to the other studies, the positivist philosophy was adopted to assess the nutrition literacy and knowledge among RFPS in Ghana.

Research Design

The choice of the positivist paradigm is impacted by practical implications on the specific methods and procedures for acquiring the required data, hence the selection of a research design that best suits the research problem. Research design has irrefutably been explained as the blueprint of the study, which details the time frame for the study, methods of data collection, measurement of variables and analysis of data which is conceived to find answers to the research questions (Bhattacharjee, 2012; Cooper & Schindler, 2014; Kothari, 2004; Sreejesh, Mohapatra & Anusree, 2014; Zikrunda, Babal, Carr & Griffin, 2014).

Sreejesh et al. (2014) and Cooper & Schindler (2014) identified the main types of research designs as exploratory, descriptive and causal. Similarly, Singh (2007) noted two main types of quantitative research designs, namely: exploratory and conclusive. Singh (2007) contended that although the conceptual structure may be designed encompassing other specific types (i.e.,

descriptive and causal), these two are the core types extracted from the many design. It can be deduced that the types of research designs are nested, suggesting that exploratory studies shape the foundation for descriptive studies, which also set the basis for causal studies. Kothari (2004) suggested that the choice of research design should necessarily adhere to values that guard against bias and maximise reliability, with due consideration for the economical completion of the study.

Sreejesh et al. (2014) further classified descriptive research by method of data collection (i.e., survey and observation) and time dimension. There appears to be a wide acceptance of two main dimensions of time in research, namely: cross-sectional and longitudinal. In cross-sectional studies, data on current attitudes, opinions, or beliefs, and actual behaviour of a predetermined population or a sample of the population could be collected from a day to a few weeks or more (Creswell, 2012; Fraenkel, Wallen & Hyun, 2012). Most surveys fall into the descriptive research design and are cross-sectional in nature (Sreejesh et al., 2014). A typical survey usually studies a segment of the population using a sampling method and generalises the data collected. Owing to the constraint of time and budget imposed on the researcher, there was the need for a cross-sectional study and an application of a sample survey.

Accordingly, in relation to the objectives of the study, the research philosophy, as well as the suggestions for the selection of a research design, the cross-sectional design was deemed appropriate for this study. This study met the conditions for choosing such a research design to investigate the topic. First, the research was designed to answer the research questions of what, which, and how through the analysis of relationships between and among variables. Next,

the design afforded the researcher the chance to investigate the opinions of RFPS on culinary nutrition within a relatively short period of time. Again, it provided a framework to describe the sources of nutrition information used by the production staff, as well as the time allocated to the search, their level of trust in the sources and the barriers thereof. Lastly, the chosen design provided meaningful suggestions for culinary nutrition decision making and training.

Data and Sources

The study relied on both primary and secondary sources of data and information respectively. The primary data was obtained directly from RFPS who participated in the field survey in the five selected regions in Ghana. Secondary information was obtained from existing documents and government reports. The main sources of documents and reports included; the Catering and Hotel Directory (GTA, 2013-2017), the 2014 GDHS Report, the 2010 Ghana Population and Housing Census Reports, the 2009 Dietary and Physical Activity Guidelines for Ghanaians. Specifically, the lists of licensed hotels and restaurants from GTA (2017) were used as the sampling frame for the selection of the participating restaurants and used to infer the changes in the number of facilities over the period.

Target Population

The study targeted RFPS who could read and understand simple sentences. The study focussed on this category of restaurant staff because they are responsible for processing the food ingredients and engage in other food

production activities (that could either cause the leaching out or retention of some important nutrients during food production).

In addition, there seems to be a rising implicit responsibility on the part of each RFPS to search for nutrition information by themselves. This equips them to either solve nutrition-related problems by themselves or contribute actively in the kitchen, towards general nutrition decisions taken by management of the food service establishment. Indeed, they are at the centre of the food production and are tasked with the responsibility of providing nutritionally balanced food to consumers.

Sample Size

A total of 736 food production staff from 184 restaurants across the five regions were involved in the study. This number was arrived at based on a reconnaissance survey in 10 selected restaurants in Accra. It was observed from the reconnaissance survey that the basic kitchen structure for production staff features an executive chef, sous chef, cook, assistant cook hence the decision to sample four food production staff per restaurant. Subsequently, the 184 restaurants were multiplied by the number of production staff (four) to achieve the desired sample size of 736 for the study. The 184 restaurants represent 20 percent of the total independent and hotel restaurants selected to be part of the study.

Sampling Procedure

Consistent with the philosophy guiding this study, a multistage sampling technique was used to select the desired number of restaurants and respondents

for the study. The sampling process started with a categorisation of all licenced restaurants in the regions of interest. A list of all licenced independent restaurants (IR) and all restaurants attached to licensed (hotel restaurants [HR]) obtained from the GTA Catering Directory and Hotel Directory respectively (GTA, 2017) was used as the sampling frame. This directory or database provides general information on restaurants and hotels in Ghana such as region, physical location, postal, e-mail and website address, phone numbers, grade. For the restaurants, additional information such as seating capacity, menu, and menu item prices are specified in the directory.

In the GTA Catering Directory and Hotel directory, the list had already been disaggregated into two categories, namely: licenced formal sector catering establishments and licensed formal accommodation. The list was further disaggregated into 7 subcategories for the catering establishments and three subcategories for the licensed accommodation establishments. For this current study, the first subcategories in both cases were considered, specifically, restaurants and star-rated hotels. Based on this, two restaurant types were identified, namely: independent restaurants and hotel restaurants. In all, 382 independent restaurants (42.3%) and 521 hotel restaurants (57.7%) were identified as the primary sampling units.

The different grades of restaurants were considered as the second stage sampling units. The list had been grouped into strata using the grade of restaurants and the star-rating of hotels as the grouping variables. Each grade or star-rating represented a stratum per region. Whilst all three grades (Grade 1, 2 and 3) under the independent restaurants were given consideration, only 1 to 3 star rated hotels under the hotel restaurants were considered. The decision to

sample from only 1 to 3 star rated hotels was based on the issue of representativeness, since an important element in the determination of a sample size in a quantitative study is its representativeness. These categories of hotels were in the majority and could be found in almost all the selected study regions. In all there were six strata representing the two types of restaurants.

At the third stage of the sampling process, the researcher decided to draw 20 percent (i.e., 1/5 sampling fraction) of the restaurants from each of the six strata. This decision was guided by the issues of time and resources available to the researcher. Again, this decision was supported by the procedure proposed by Fraenkel et al. (2012) in applying stratified random sampling technique.

Table 1: Distribution of Sample Size (Independent Restaurants) by Region and Grade

Region	Population by Grade			Total	Sample by Grade			Total
	G. 1	G. 2	G. 3		G. 1	G. 2	G. 3	
Greater Accra	48	132	37	217	10	26	7	43
Tema	14	22	7	43	3	4	1	8
Ashanti	4	23	24	51	1	5	5	11
Western	4	13	14	31	1	3	3	7
Northern	0	14	13	27	0	3	3	6
Central	0	4	9	13	0	1	2	3
Total	70	208	104	382	15	42	21	78

Source: Field survey, Addison (2017)

According to Fraenkel et al. (2012), a researcher could draw a percentage from the population to represent the group in a cross-sectional study for the sake of time and resources availability. The selection of restaurants involved the use of simple random sampling procedure (specifically, the lottery method) to select 20 percent from each stratum of the population (Tables 1 & 2). This was to ensure proportional representation within the sample. As with most research employing a probability sampling method, a replacement list was prepared to easily substitute restaurants which were not in the position to participate in the study. The different categories of restaurants needed for the study largely influenced the enlisting process.

Table 2: Distribution of Sample Size (Hotel Restaurants) by Region and Grade

Region	Population by Rating			Total	Sample by Rating			Total
	3-Star	2-Star	1-Star		3-Star	2-Star	1-Star	
Greater Accra	9	69	101	179	2	14	20	36
Tema	1	13	30	44	0	3	6	9
Ashanti	8	49	73	130	2	10	15	27
Western	8	21	69	98	2	4	14	20
Northern	0	9	11	20	0	2	2	4
Central	4	17	29	50	1	3	6	10
Total	30	178	313	521	7	36	63	106

Source: Field survey, Addison (2017)

At the fourth stage, the actual respondents (food production staff) were sampled from each of the selected restaurants. To get the actual respondents from each restaurant, the researcher multiplied the sample size by 4, which resulted in the total sample size of respondents per restaurants for each region (Table 3) as explicated in the preceding paragraph under the subtitle sample size.

Table 3: Distribution of Sample Size (respondents) by Region and Restaurant Type

Region	Sample size by restaurant type		Total
	IR	HR	
Greater Accra (plus Tema)	204	180	384
Ashanti	44	108	152
Western	28	80	108
Northern	24	16	40
Central	12	40	52
Total	312	424	736

Source: Field survey, Addison (2017)

At the restaurants, the selection of the food production staff was based on two main factors. First, the four positions (i.e., the executive chef, sous chef, cook and assistant cook) identified during the reconnaissance survey. The second factor taken into account was the actual number of food production staff occupying each of the four positions. After identifying the positions and people,

two main sampling techniques were applied, namely: simple random and purposive sampling. Specifically, the lottery method was applied to select one staff member from the positions of interest with more than one production staff until four production staff were gotten. This was typically applied to the cook position. On the other hand, in cases where the positions of interest staffed only one production staff, that person was purposively selected to participate in the study.

Since general literacy is fundamental to this study, the respondents needed to meet the inclusion criterion to qualify to participate. For that matter, the respondents needed to demonstrate the ability to read simple sentences by reading the consent form. This was necessary because the study was carried out with the assumption that some basic ability in reading was required to search for nutrition information, especially from the print media. Notwithstanding other non-print sources were solicited from the respondents.

Method of Data Collection

The study depended on structured interviews for data to achieve the study objectives. This is a method commonly used in survey research and affords the researcher the opportunity of collecting data from respondents face to face (Babbie, 2010; Creswell, 2012). With structured interviews, interviewers ask questions and record respondents' answers instead of asking the respondents to read and record their own responses. Each respondent is asked the same questions to ensure standardisation of responses.

There are numerous benefits associated with this method. First, it yields higher response rates than the self-administered questionnaires. It also ensures

completeness of questionnaires and finally, gives room for probes and clarification of questions which are not well understood by the respondents (Babbie, 2010). This method proved worthwhile in this study because of the technical nature of some of the items on the questionnaire. In addition, because of the busy schedule of the respondents, it was more efficient and quicker collecting the data through this means.

Data Collection Instrument

To determine the nutrition literacy and knowledge status of RFPS, some form of assessment was undertaken. In this regard, there was the need for an instrument to aid in the assessment. Assessment instruments provide direction for determining nutrition information and skills according to individual nutrition literacy needs. One of the most important considerations in the process of developing an assessment instrument is the correct identification of the components to be measured (Arslan & Nalinci, 2014). Through extensive literature review and advice from the expert panel, the components to be measured were identified and an interview schedule was developed to solicit quantitative data from the RFPS in keeping with the positivist paradigm guiding this study.

The data collection instrument development was in two phases. In the first phase, a 7-member expert panel of food and nutrition professionals was constituted to generate ideas on issues related to nutrition literacy and knowledge in the restaurant setting using the Delphi method. This method is a consensus development technique which is applicable in domains where there is little research or where there could be benefits derived from a collective

subjective decision of experts (Hejblum et al., 2008; Vernon, 2009). The Delphi method was preferred because of the inherent advantage of soliciting information from several experts without necessarily convening a meeting for all of them (Avella, 2016). The researcher could not afford hosting the experts to a meeting due to the expenses involved.

The 7-member expert panel was constituted of 5 food production and/or nutrition educators with food service background representing three tertiary institutions in Ghana (with departments offering hospitality or catering programmes), and 2 chefs representing the Chefs Association of Ghana (Table 4).

Table 4: Distribution of Sample Size (expert panel) by Affiliation

Affiliation	Number Sampled
Accra Technical University	2
Takoradi Technical University	2
Koforidua Technical University	1
Chefs Association of Ghana	2
Total Sample	7

Source: Field survey, Addison (2017)

The educators were selected from three tertiary institutions using the snowball method because of the difficulty associated with identifying the desired participants from an unknown population. To minimise the element of bias, the researcher rolled out two balls and the same members were highly recommended.

The other 2 panel members representing the Chefs Association of Ghana were purposively selected based on recommendation from the president of the association. The terms of reference and questionnaires (Appendix A) were e-mailed to the expert panel on 26th October, 2017. The primary reference of the expert panel included the following: (a) explain nutrition literacy; and (b) provide an expert advice on possible areas for testing knowledge on nutrient retention. The process was facilitated by the researcher through emails using a two-round Delphi method. The emerging views expressed by the panel members have been summarised in Table 5.

Table 5: Views from Expert Panel on Nutrition Literacy and Nutrition Knowledge

Areas	Views and clarification within the restaurant setting
Understanding of Nutrition Literacy	<ul style="list-style-type: none"> • Nutrition literacy may be defined as the extent to which one can obtain, understand and use nutrition information to maintain a healthy life; • Nutrition literacy refers to the set of abilities needed to understand the importance of good nutrition in maintaining health.
Consensus on Nutrition Literacy Indicators	<ul style="list-style-type: none"> • Know where and how to get information on nutrition • Focus on nutrition symbols and jargons or terminologies • Understand language on food labels • Understand the information sought • Know how to use the information obtained
Nutrition Knowledge questions ideas	<ul style="list-style-type: none"> • The knowledge of the various nutrients in different types of foods and the effect of preparation and holding, storage, cooking, etc. • The effect of heat exposure on the nutritional value of food • The effect of air exposure on the colour, flavour and nutrient content of food • How are nutrients affected when fruits and vegetables are kept in water (cut or whole)? • How to properly wash fruits and vegetables (e.g. Under running water, with vinegar etc.) • The effect of soaking some fruits and vegetables in water

Additional information

- Thawing of frozen foods
- Cooling of hot foods
- Over cooking food
- How long can cooked food be held prior to service not to affect its nutrient?
- Which of these should be a priority: taste/presentation and nutrition?
- Would you prefer to serve a nutritious meal to a tasteful one?
- Whose responsibility is it to ensure or look out for good nutrition in a meal – Cook or customer/guest?
- Many industry stakeholders need to understand the basic purposes why food is consumed in the first place.
- To practice good nutrition, nutrition literacy is key.

Source: Field survey, Addison (2017)

In brief, the panel members contributed immensely to the study by confirming the understanding of nutrition literacy. It is evident that their understanding of nutrition literacy within the restaurant environment is similar to that of other settings such as the health and school nutrition. Most importantly, through their collective subjective judgements on what should be included on the nutrition knowledge assessment, the researcher's attention was directed to important practical points to measure under nutrition knowledge construct. They submitted considerable amount of information that was important in drafting the survey instrument for the actual fieldwork.

In the second phase, the existing literature on the subject matter was probed for more variables and items to supplement the feedback gotten from the expert panel. Through this exercise, a questionnaire was developed reflecting the research objectives (Appendix B). The instrument comprised open-ended, multiple choice questions, dichotomous questions and Likert-type scales. The developed instrument was then given to one of the experts in the field of food

and nutrition education to assess the content validity of the nutrition knowledge and literacy measurement items. Following the suggestions, minor changes were made on the questionnaire accordingly. The final questionnaire was structured into seven sections, addressing the issues being measured in the objectives. Table 6 provides a summary of the instrument sections, rationale for investigation, area of enquiry and the nature of response required from the participants.

The first part required the respondents to provide information on sources, use, amount of time committed to the search, attributes of the sources and trust in nutrition information sources. The second section identified the barriers to seeking nutrition information. The barrier statements were adapted from Health Information National Trends Survey [HINTS] (National Cancer Institute, 2017), Ndahura (2012), Zoellner and Carr (2009) and Zoellner et al. (2009).

The third section assessed respondents' procedural nutrition knowledge. The nutrition knowledge questions (10 questions) were inspired by the expert panel and through a thorough literature search (Drummond & Brefere, 2010; NFSMI, 2011; Khan, 1998; Thompson & Manore, 2012). The respondents were required to provide true or false answer to each question. Respondents who answered up to 5 questions correctly were considered to possess low nutrition knowledge; 6 to 7 questions correctly had moderate nutrition knowledge; and 8 to 10 questions correctly had a possibility of adequate nutrition knowledge (Zoellner & Carr, 2009).

Table 6: Survey Instrument, Rationale, Area of Enquiry and Response Needed

Section	Rationale for investigation	Area of enquiry	Response
Sources of nutrition information	Indication of frequently utilized sources, Allows for analysis of relationship between sources used and socio-demographics and employment characteristics.	Previous sources of nutrition information used	MCQ
Time spent searching	Allows for exploration of the effort put in by RFPS in searching for information	Time (minutes/hours) committed to previous search	OEQ
Attributes of sources	Indication of qualities of source utilized	Reliability, expertise, clearness, accessibility	MCQ
Trust in sources	Allows ranking and analysis of perceived credibility of sources, and analysis of relationship between trust and socio-demographic and employment characteristics	Trustworthiness of source for nutrition information	5-pt Likert ^a
Information need	Indication of information need on some selected topics	Food and nutrition-related topics and expression of need	Dichotomous
Ideal sources of nutrition information per food related topic	Indication of preferred sources for meeting the information need	Preferred sources for communicating nutrition information	MCQ
Barriers to seeking	Allows assessment of individual constraints regarding information search	Individual barriers to seeking nutrition information	5-pt Likert ^b
Nutrition knowledge	Allow assessment of knowledge on nutrient retention by restaurant type and other variables	Nutrient retention practices along the food flow stages	Dichotomous
Levels of nutrition	Allows vertical and horizontal assessment of	Functional, interactive and	5-pt Likert ^b

literacy	nutrition literacy levels	communication literacy levels	
Confidence in nutrition decision	Allows assessment of perceived confidence level in taking nutrition decisions	Perceived confidence in acting to enhance nutrition value of food	5-pt Likert ^c
Barriers to the application	Allows assessment of personal and operational constraints regarding information search	Individual and operational barriers to application of nutrition knowledge	5-pt Likert ^b
Socio-demographics and employment characteristics	Allows for analysis of relationships between demographic and employment characteristics and other dependent variables. Indication of representativeness of sample	Sex	Dichotomous
		Age	OEQ
		Education level	MCQ
		Nutrition course studied	Dichotomous
		Marital status	MCQ
		Religion	OEQ
		Ethnicity	OEQ
		Employment status	MCQ
		Industry experience	OEQ
		Current position	OEQ
Years worked in current position	OEQ		
In-service training	OEQ		

Source: Author's Construct (2017)
 OEQ, open ended question; MCQ, multiple choice question; Pt, point
^aVery low/low/average/high/very high
^bStrongly disagree/disagree/neutral/agree/strongly agree
^cNot confident at all/a little confident/somewhat confident/very confident/completely confident

The fourth section assessed respondents' levels of nutrition literacy. The constructs and items of the Nutrition Literacy Levels Scale was adapted from Ishikawa et al. (2008b). The NLS has been very useful in the assessment of nutrition literacy in different settings (Ndahura, 2012; Zoellner & Carr, 2009; Zoellner et al., 2009). The NLS comprise a three-dimensional measure with 30 items. The three dimensions of the scale include: functional, interactive and

critical literacy. The scale was developed on a five-point Likert scale from strongly disagree to strongly agree. Appendix C provides a summary of the constructs, the items and the relevant sources from which the items were drawn.

The fifth section assessed respondents' level of confidence in making culinary nutrition decisions. The scale was adapted from Zoellner et al. (2009). The original scale measured only four items developed on a five-point Likert scale from not at all confident to completely confident but was extended by the researcher to include 9 items in all. The RFPS were required to judge their confidence or efficacy by selecting one of the scale points. The confidence was then designated in terms of level (low, moderate and high). A low cut off point is 2, moderate cut off point is 3 and 4 and a high cut off point is 5. The sixth section identified barriers to the application of nutrition knowledge. The final section of the instrument measured the socio-demographic and employment characteristics of the respondents.

Training of Field Assistants

Training of the field assistants took place over a 4-day period and involved four field assistants (2 women and 2 men). The training was conducted in the office of the researcher in the University of Cape Coast from 14th to 17th November, 2017. Three graduates from University of Cape Coast, and one Master student from University for Development Studies assisted in the data collection.

During the first day of training, all the field assistants were briefed on the purpose of the study, given an overview of the data collection exercise, and some technical words (nutrition terms) were also explained to them. On the

second day of training, the field assistants were introduced to the instrument and briefed on the major sections. After that, they were taken through the sampling procedure and instructed on how to identify respondents and administer the instruments.

During the third and final days, the field assistants were involved in a detailed review of each item on the instrument. This was followed by a mock instrument administration between participants. The trainees were mainly evaluated through observation during the mock practice and pre-testing of the instrument. After the training, the field assistants and researcher were assigned one region each. However, the activities of the field assistants were constantly monitored by the researcher and support was given when needed.

Pre-testing of Instrument

The research instrument was pre-tested to ensure content validity and clarity of the questions before the actual field work began. The field assistants had the opportunity to practice with real respondents during the pre-testing of the instrument. The pre-test occurred from 21st November, 2017 to 8th December, 2017 in Takoradi using 20 RFPS sampled from six restaurants. After administering the instrument, some parts of the instrument were revised. Specifically, double barrelled and ambiguous questions were identified and revised.

Another issue that emerged which needed revision was the employment status of employees under the employment characteristics. It was observed that 'contract' should have been listed as one of the options under employment status and was noted accordingly. The revised instrument was then reviewed by one

food and nutrition educator. After the suggested revisions were made, the final instrument was then printed for the actual fieldwork.

From the pre-test, it was also realised that the team going to the field had to prepare themselves to assist the respondents in completing the instrument because of the technical nature of some of the measurement items. In addition, the instrument was quite bulky and to ensure its completeness, the respondents needed assistance. Finally, the pre-test was beneficial in determining the average time for completing each questionnaire.

Actual Fieldwork

Prior to the data collection exercise, some procedures were followed. At the outset, the human resource manager and/or general manager of the various facilities sampled were contacted for authorisation to have access to the kitchen staff. The managers then introduced the researcher to the head of the kitchen who led the researcher and field assistant to the food production staff. Appointments were scheduled to meet with the respondents to administer the instrument at a time convenient to them because most of the facilities operated the shift system.

The actual fieldwork was carried out from 16th December, 2017 through to 9th February, 2018. However, the data collection had to be halted from 22nd December to 28th December, 2018 to make way for the Christmas festivities. Even so, the research team took advantage of the break to establish contacts with the other restaurants yet to be contacted for their involvement in the data collection exercise. With the support of four field assistants, data collection took place in the selected restaurants within the five regions concurrently.

In most cases, the head of the kitchen introduced the researcher and field assistant, as he/she briefed the selected respondents before the administration of instrument started. The researcher also took the opportunity to rehash the purpose of the research and requested the consent of the respondents before the beginning of the exercise. Respondents who needed further clarification about the study also put forward their concerns and they were addressed appropriately. Fortunately, none of the respondents identified withdrew from the study. This was possibly due to the involvement of their supervisors, and because they were assured of confidentiality of information.

Table 7: Distribution of Respondents by Restaurant Type

Restaurants	Respondents	Percent (%)
Independent restaurants	218	43.9
Grade 1	37	7.4
Grade 2	115	23.1
Grade 3	66	13.3
Hotel restaurants	279	56.1
1 – Star	127	25.6
2 – Star	118	23.7
3 – Star	34	6.8
Total	497	100.0

Source: Field survey, Addison (2018)

Out of a sample of 184 facilities, 172 (representing 93.48%) restaurants granted the research team access to the kitchen to interact with the production staff. It is worth noting, however, that the staff strength varied substantially for

each restaurant. Therefore, kitchen structure was relied on to select respondents representing each position to ensure that all the positions were covered. In the end, out of 736 respondents targeted for the survey, 497 production staff participated in the study (Table 7).

Since the respondents were sampled from two types of restaurants, the circumstances surrounding the administration of instruments differed. For instance, the respondents who were sampled from the Hotel restaurants were willing to be engaged during the period after breakfast service or during lunch service. On the other hand, the administration of instruments was done mostly during lunch service for those sampled from the Independent restaurants. The interviews were conducted during these periods because service was ongoing, and the food production staff were quite free. Notwithstanding, for the few Independent restaurants that operated in the evenings the instruments were administered any time between 10:00am and 2:00pm based on appointments. Generally, each session lasted between 25 to 35 minutes.

Challenges Encountered on the Field

Like every research, this study also encountered some challenges worthy of note. The main challenge encountered during the instrumentation phase of the research had to do with identifying the right people (experts) to help put some of the issues and concepts into perspective. However, with the help of some colleagues and the snowball method, seven experts were identified to complete the first phase. The challenges encountered during the actual fieldwork are as follows:

First, it was difficult locating some of the establishments because they either did not have any signages or the phone numbers provided to GTA was inactive. For some of them, it was even more difficult locating them with GPS. The researcher and field assistants had to rely on residents and friends for direction. Next, some registered restaurants at the time of data collection had halted operations for renovations. In such a situation, the replacement list was used to sample other restaurants.

Moreover, while some managers thought of the research as interesting and beneficial to their operations, others also saw it as a sensitive issue with the potential of exposing their inefficiencies. Again, some of the managers thought the team had been sent there by FDA to pick up their wrong practices and report them. However, after explaining the purpose of the research and how respondents were going to be held anonymous of their respective responses, they agreed to allow their staff to participate in the study. Besides, with the introductory letters issued by the department, the researcher was duly introduced as a student on a purely academic quest.

Furthermore, during the instrument administration, getting the full attention of some of the respondents was quite difficult. There were interruptions from other colleagues and supervisors who needed information or help from the respondents. This extended the session beyond the estimated time. Notwithstanding, the researcher and field assistants were patient and waited for them to resume the session. In extreme cases, the sessions were rescheduled to complete the instrument at a later date.

A common practice in the restaurant sector is the shift system where employees report to work on schedule. This presented an issue where the

sampled respondent was not on duty to respond to the questionnaire. In situations like this, the research team had to book another day when the food production staff would be at work to complete the questionnaire.

Finally, some of the supervisors thought bulk administration was better than individual type. They thought it would save them more time; therefore, they suggested the former. To overcome this challenge, the research team had to convince them of the likelihood of one respondent influencing the responses of the others even though they represented the same restaurant. In addition, the research team explained to them that instead of holding up all the selected respondents, it would be better that while one is being interviewed the others could attend to their tasks and that of the person engaged by the researcher. After the persuasion, they were convinced and agreed to go by the original plan. The respondents, therefore, waited for their turns for the instruments to be administered to them.

Overall, the data collection exercise was successful with most of the RFPS requesting their scores especially for the nutrition knowledge assessment. The researcher had to spend extra time with them to discuss further, particularly regarding the questions they scored wrong on the knowledge test. Some of them regarded the nutrition knowledge assessment as a true test of their competence and were willing to learn.

Data Processing and Analysis

Data collected were checked for accuracy and completeness and entered into the IBM SPSS Statistics version 25 and Stata 15 for further processing and analysis. Descriptive and inferential statistics were largely used to analyse the

data. Descriptive statistics such as percentages, frequencies, crosstabs, means, and standards deviations were determined and summarized given the individual characteristics of the respondents as well as the construct and scaled items.

The nutrition knowledge questions were analysed by scoring and grading the respondents based on the number of correct responses. The scores were categorised as low, average or adequate nutrition knowledge denoting the knowledge level of the respondents. Thus, respondents who answered up to 5 questions correct were considered to possess low nutrition knowledge; 6 to 7 questions correct had moderate nutrition knowledge; and 8 to 10 questions correct had a possibility of adequate nutrition knowledge (Zoellner & Carr, 2009).

Moreover, other inferential statistics performed on the data included: Chi-square Test of Independence, Independent Samples T-Test, One-way Analysis of Variance (ANOVA), Confirmatory Factor Analysis (CFA), and Multiple Linear and Hierarchical Regression Analysis. Chi-square Test of Independence was used to analyse the relationships between the type of information source used and socio-demographic and employment characteristics of the RFPS. Additionally, Independent Samples T-Test and One-way Analysis of Variance (ANOVA) were used to explore the variations in trust in information sources, time committed to nutrition information sources, nutrition knowledge level and confidence in nutrition decision making across the respondents' socio-demographic and employment characteristics. For those categories where ANOVA results indicated a significant overall difference between groups, post hoc tests were conducted using the Tukey to determine which groups significantly varied with regard to the dependent variable.

The CFA was further employed to assess the underlying structure and parsimony of the measurement scale on nutrition literacy. Although the scale has not been tested among the same group in Ghana, the researcher proceeded with CFA for one main reason. The NLS has been tested in prior studies of this nature and the instrument has proven to be reliable in other settings (Ishikawa et al., 2008b; Ndahura, 2012): This is an already developed scale which was adapted to suit this current study context. By this, it was preferable to run CFA to confirm the underlying measurement theory.

Lastly, hierarchical model was used to estimate the effects of respondents' socio-demographic and employment characteristics, trust in sources, total time for seeking and barriers to seeking on nutrition knowledge. Multivariate and bivariate linear regressions models were performed to assess the influence of confidence in seeking, trust in sources, and barriers to seeking on the NL constructs. The multiple linear regression was used to estimate the predictors of confidence in culinary nutrition decision using confidence in seeking nutrition information, nutrition knowledge, industry experience and barriers to nutrition knowledge application as the independent variables.

Validity and Reliability of the Study

There are two standards commonly used to evaluate the methods of measurement in scientific research, namely: validity and reliability (Bosiaugh, 2013). The concepts of validity and reliability are key concepts in scientific research as they border on the quality of data and dependability of the research outcome. The quality of data in survey is often influenced by aspects such as the choice of questionnaire design, sampling methods, scaling techniques and

interviewer qualification and training (Sreejesh et al., 2014). Validity refers to the accuracy of a measure or the extent to which a score truthfully represents the underlying constructs that it is supposed to measure (Bhattacharjee, 2012; Zikmund et al., 2014). On the other hand, reliability is defined as “the consistency with which the results are produced under the same conditions with the same or comparable populations” (Sreejesh et al., 2014:72). Essentially, these two concepts are evaluated in terms of acceptable levels in a specific context and not absolutes. This is attributable to the complexity of measuring some constructs with regard to their abstract nature and multi-dimensionality (Bhattacharjee, 2012; Boslaugh, 2013).

There are established ways of ensuring the accuracy and consistency of good measures. Since there is no scholarly consensus on the different forms of validity, this study adhered to the types identified by Zikmund et al., (2014) which is commonly accepted by most researchers. Zikmund et al., (2014) identified four basic approaches to establishing the validity of a measure as face, content, criterion and construct validity.

Face validity, which is relatively easier to assess, refers to whether a scale seems to be a reasonable measure of its underlying construct given the collective agreement of experts and researchers on the validity of the measurement scale (Bhattacharjee, 2012; Sreejesh et al., 2014; Zikmund et al., 2014). This was achieved by asking an expert to assess if the content reflected the constructs in terms of accuracy and completeness of measurement items.

Content validity refers to the degree to which a measure covers the domain of interest and it is of concern when the purpose of the measurement is to draw inferences about a larger domain of interest (Boslaugh, 2013; Zikmund

et al., 2014). This was achieved in two ways: (1) by performing a literature review of the topic before constructing the questionnaire, and (2) by asking the panel of expert to identify possible areas and questions, especially for the knowledge assessment which used nutrient retention strategies as the proxy. This was to ensure that the knowledge items adequately covered the content.

Criterion validity addresses the practicality of the measure. To evaluate criterion validity, the researcher must ensure that the measure conforms to other traditional measures (Sreejesh et al., 2014). In other words, it measures the ability to compare the scale to an already validated measuring scale (Scott & Mazhindu, 2005). This was established by adapting already validated scales used in other settings and among different populations to measure nutrition literacy and knowledge.

Construct validity is established when a measure corresponds to the underlying theoretical constructs that are being measured (Sreejesh et al., 2014; Zikmund et al., 2014). A common statistical method used to demonstrate construct validity (convergent and discriminant) is exploratory factor analysis (Bhattacharjee, 2012). However, most researchers have limited their exploration of the 3-dimensional construct to EFA (Blegen, 2011; Ishikawa et al., 2008b; Ndahura, 2012; Pettersen et al., 2009). A CFA was performed to confirm if the attitude statements adapted from Ishikawa et al. (2008b) and Nutbeam (2012) measured the three levels of nutrition literacy in the study context. The factors loaded significantly between 0.51 and 0.83, although 7 of the factors had to be removed due to low factor loadings.

Additionally, some measures were employed to ensure the consistency of the measurement instrument. Reliability of the scale is concerned with the

degree to which the measure is free from errors and as a result produces consistent results (Sreejesh et al., 2014). It is duly acknowledged in this study that random errors of measurements are difficult to control because they happen due to chance. Notwithstanding, both random sampling and systematic errors were minimised by ensuring the following: (1) probability sampling design was followed to ensure representativeness (2) a questionnaire was used to gather data to reduce the level of subjectivity, (3) measurement items were devoid of ambiguity, (4) the respondents were guided and assisted in answering the questionnaires and (5) the internal consistency of the developed constructs were assessed using the Cronbach's coefficient alpha.

Ethical Considerations

As with most scientific studies, some ethical issues were adhered to as part of the study. They included informed consent, anonymity and confidentiality. Foremost, written informed consent was obtained from the respondents after having fully informed them about the rationale of the study, the objectives of the study, and the possible benefits of the study. The respondents were, therefore, required to tick 'yes' before proceeding with the completion of the questionnaire.

Next, managers of the restaurants as well as the respondents were guaranteed that the responses given would not be associated with either the restaurants or the respondents. To fully assure them, personal data such as name, phone number, and address which could easily identify the individuals were not solicited. The anonymity of the facilities and respondents were protected by

assigning each questionnaire a unique identifier before data entry. The restaurants were categorised under independent (IR) or hotel restaurants (HR).

Finally, respondents were assured that the information given was going to be held in high confidence. It was explained to them that the study was purely academic, and the data would not be disclosed to other persons not directly involved in the data collection process or thesis assessment under any circumstance. Confidentiality was assured by securing the questionnaires in a safe place only accessible by the researcher. The data was also protected with a password.

Chapter Summary

This chapter was devoted to the description of the research methods employed to carry out this study. The study was carried out in five regions purposively selected, namely, Greater Accra, Ashanti, Western, Northern and Central Regions. Further, the research philosophy and design were described and justified accordingly. Specifically, the study adopted the positivist standpoint because of the inherent advantage of generalisation. Again, in tandem with the philosophy, the cross-sectional research design was employed. In addition, the type and sources of data, research instrument, data collection procedure, data processing and analysis were also discussed. The concluding section of the chapter summarised the ethical issues considered in carrying out this study.

CHAPTER FIVE

PROFILE OF RESPONDENTS AND SOURCE OF NUTRITION INFORMATION

Introduction

This chapter presents the socio-demographic and employment characteristics of the respondents as well as their preferred sources of nutrition information. The socio-demographic variables used in this study were sex, age, marital status, education, religion, and ethnicity. The employment variables were employment status, industry experience, current position, number of years worked in current position, in-service nutrition training, and duration of training.

It is necessary to establish the background characteristics of the RFPS in order to understand how these characteristics are likely to influence the sources they use, knowledge and literacy levels as well as decision-making. Some studies have established some relationships between respondent's socio-demographic characteristics and nutrition sources (Aihara & Minai, 2011; McKay et al., 2006; Zoellner et al., 2009). Other studies have also revealed relationships between some employment characteristics and nutrition literacy scores.

In addition, the SCT and the Conceptual Model of Nutrition Literacy stresses on an individual's ability to acquire and understand nutrition information and to handle tasks correctly. Hence, the exploration of personal and environmental factors that have some relationships with respondents' nutrition knowledge, nutrition literacy status and confidence in making nutrition

decisions. Finally, the chapter discusses the utilisation of nutrition information sources among RFPS, as well as the relationships across the socio-demographic and employment characteristics.

Socio-demographic Characteristics of Respondents

There were more females (61.2%) than males (38.8%) in the study (Table 8). This finding conforms to the general expectation in the food service sector because, typically, females dominate this profession (cooks).

Table 8: Socio-demographic Characteristics of Respondents

Socio-Demographic Characteristics	N	Percent
Sex		
Male	193	38.8
Female	304	61.2
Age (years)		
<25	135	27.2
25-34	276	55.5
35+	86	17.3
Marital status		
Single	354	71.2
Married	143	28.8
Educational attainment		
Primary/JHS	50	10.1
SHS	175	35.2
Vocational	105	21.1
Polytechnic	127	25.6
University	40	8.0
Religious affiliation		
Christianity	441	88.7
Islam	56	11.3
Ethnic orientation		
Akan	297	59.7
Ewe	69	13.9
Ga-Dangbe	65	13.1
Mole Dagbani	61	12.3
Other tribes	5	1.0

Source: Field survey, Addison (2018)

Regarding age, the sample involved a more youthful group with a greater number of the respondents (55.5%) aged between 25 and 34 years. The mean age of about 29 years suggests that most of the respondents were within the active working age category. The age range in this study is in line with what has been reported by Jeon, Park, Jang, Choi, & Hong (2015) who found out that 70.7 percent of the kitchen staff were within the age group of 20-39 years.

Regarding marital status, the data suggest that most of the respondents were single (71.2%) while 28.8 percent were married. A reasonable level of educational attainment was recorded for the respondents, however a greater number of them did not have a degree. Table 8 indicates that majority of the RFPS were WASSCE/SHS certificate holders (35.2%), followed by HND holders (25.6%), Vocational certificate holders (21.1%) and about 10 percent had completed Junior Secondary School or Primary school.

Again, evidence from Table 8 indicates that two main religious affiliations were observed within the study, namely: Christianity and Islam. Approximately 89 percent of the RFPS profess the Christian faith and approximately 11 percent were Muslims. This finding was to be expected because the 2010 population and housing census reported that there were more Christians (71.2%) in Ghana than Muslims (GSS, 2013).

Furthermore, Akans (59.7%) dominated the study, followed by Ewe (13.9%), Ga-Dangbe (13.1%), Mole Dagbani (12.3%) and other tribes (1%). The ethnic distribution is in line with the 2010 Population and Housing Census with the Akans (47.3%) as the dominant ethnic group in Ghana (GSS, 2013).

Employment Characteristics of Respondents

The study also explored the employment characteristics of the respondents including requirements for nutrition training. Table 9 presents the summarised employment profile of the respondents. Approximately 56 percent of the respondents worked in hotel restaurants and the remainder (43.9%) worked in independent restaurants. Approximately 78 percent of the respondents were employed as regular staff in the restaurants while approximately 22 percent were employed on a casual basis (contract and internship/attachment).

Table 9: Employment Characteristics of Respondents

Employment Characteristics	N	Percent
Restaurant type		
Independent restaurant	218	43.9
Hotel restaurant	279	56.1
Employment status		
Regular	388	78.1
Temporary	109	21.9
Years worked in the restaurant industry		
1-5 years	362	72.8
6-10 years	84	16.9
11+ years	51	10.3
Current position		
Head Chef	44	8.8
Sous Chef	59	11.9
Cook	394	79.3
Years worked in current position		
1-5 years	429	86.5
6-10 years	53	10.6
11+ years	15	3.0
In-service nutrition training		
Trained	268	53.9
Not trained	229	46.1
Hours of in-service training for nutrition requirements		
Less than 3hours	147	54.8
3-6 hours	76	28.4
7 hours or more	45	16.8

Source: Field survey, Addison (2018)

This finding is consistent with the proportion of regular employees (83.6%) reported by Jeon et al. (2015) in a study among similar respondents. Of the RFPS who participated in this study, a greater number of the participants (70.8%) had worked in the restaurant industry for between 1 and 5 years. Again, the majority of the respondents were cooks (79.1%) and had mostly been in that position for between 1 to 5 years (86.5%) in their respective establishments.

Furthermore, a little over half (54%) of the respondents had received in-service training on nutrition requirements after their appointment while the rest (46%) had not undergone any nutrition training on-the-job. For those who had received the nutrition training, approximately 54.8 percent were given less than 3 hours training.

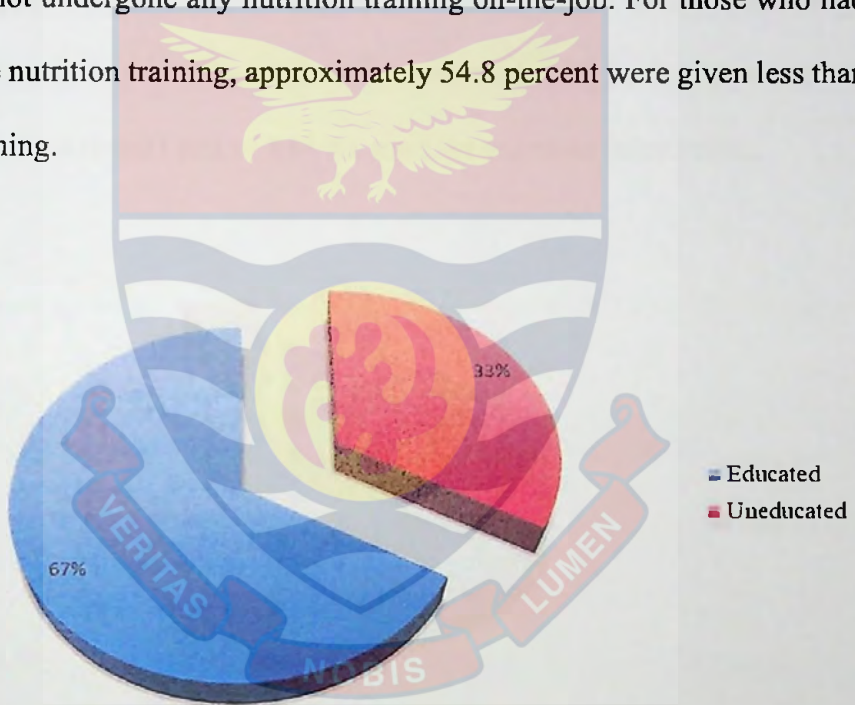


Figure 9: Exposure to Nutrition Education

Source: Field survey, Addison (2018)

However, 67 percent of the respondents revealed that they had ever studied nutrition-related courses (Figure 9) during their second cycle or tertiary education.

Nutrition Information Source Utilisation

This section explores the sources RFPS engage with to gain nutrition information. The respondents were first asked to indicate whether they have searched for nutrition information from any source within the past year. Search in this context is the voluntary effort on the part of the RFPS to obtain nutrition-related information in response to a specific information need. As shown in Figure 10, approximately 94 percent of the respondents searched for nutrition information within the past one year.

The percentage of respondents who sought nutrition information is high probably because they encountered nutrition-related tasks in their professional environment (restaurant) and so had the need for nutrition information.

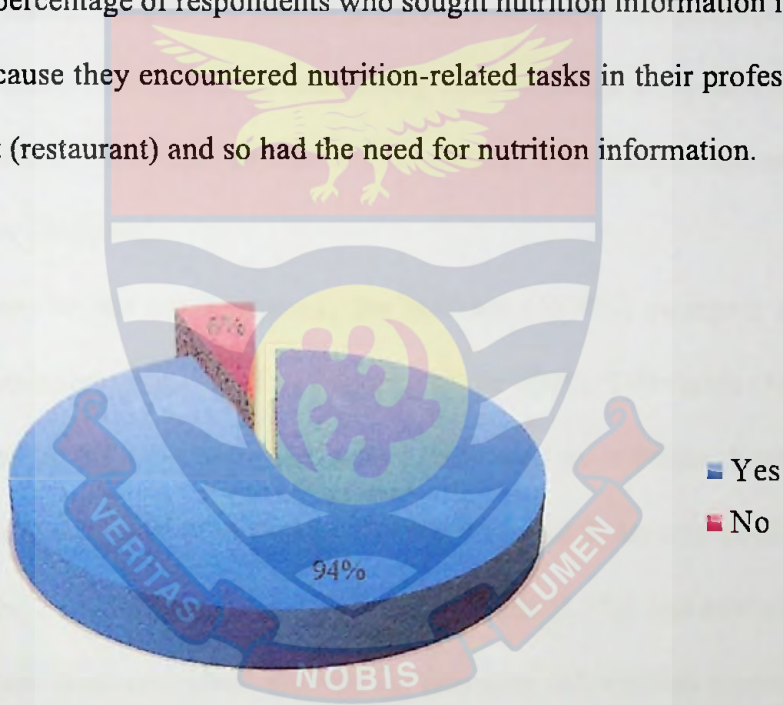


Figure 10: Nutrition Information Search within the Past Year

Source: Field survey, Addison (2018)

In addition, the majority of them have received formal education and may be exposed to the media. The 2014 GDHS report revealed that the majority of women and men aged 15-49 years were literate. In this study, all the

participants had received some formal education. This finding also emphasises Nutbeam's (2015) assertion that general literacy is a prerequisite for the performance of higher-level tasks of reading and comprehension.

Use of Communication Sources for Seeking Nutrition Information

Respondents were asked to identify their main sources of nutrition information. This was deemed necessary because to target RFPS with specific nutrition information, the primary sources from which they receive nutrition information must be identified. Silk et al., (2008) accentuated that individuals have their preferred sources from which they seek nutrition information. The proportions of RFPS that utilized each of the nutrition information sources have been shown in Table 10.

Relative to the other sources, the internet (18.9%) emerged as the nutrition information source used by majority of the RFPS. Television (16.3%) was confirmed as the next preferred source, followed by nutrition textbooks (11.4%), cookbooks (9.0%) and radio (8.1%). Only 36.3 percent confirmed using the other 7 sources. However, in all, magazines (3.3%) and newspapers (2.3%) were the least consulted sources for nutrition information among the RFPS:

The internet emerged as the primary source of nutrition information for the RFPS possibly because they have developed the skill for assessing information from the internet. The internet provides both general and tailored information, whilst making it easier for users to filter and get the desired information without having to manually gloss through the table of contents in several books or flip through several pages. The internet also affords people the

chance to remain anonymous in information seeking, hence develop themselves without exposing their ignorance to others such as their supervisors, colleagues, and dietitians.

Table 10: Sources of Nutrition Information

Information Source	N	Percent
Internet	336	18.9
Television	289	16.3
Nutrition textbooks	204	11.5
Cookbooks	161	9.1
Radio	143	8.1
Colleagues at work	131	7.4
Supervisor	117	6.6
Doctor	105	6.0
Dietitian	94	5.3
Friends/family	91	5.1
Magazines	60	3.4
Newspapers	40	2.3
Overall	1771 *	100.0

Source: Field survey, Addison (2018)

Note: * multiple responses apply

It can be inferred from the top five sources that the media plays an important role in the dissemination of nutrition information. Combined, approximately 43 percent of the respondents indicated that they received

nutrition information from the internet, television and radio. Thus, apart from the print media (newspapers and magazines), the non-print media (Internet, television, radio) emerged as important channels for accessing nutrition information. This finding mirrors some findings reported in the GDHS (2014) on exposure to mass media. The GDHS reported that 52 percent of women and 78 percent of men aged 15-49 years listen to the radio at least once a week. Similarly, 51 percent of women and 66 percent of men aged 15-49 years watch television at least once a week. Likewise, only a few women (9%) and men (17%) reported reading a newspaper or magazine at least once a week.

Further, this finding is congruent with what has been observed in other studies that have also explored utilisation and preferences for nutrition information sources across different settings. The finding that the internet is the leading source for nutrition information is similar to the study conducted by Cash et al. (2015). Their study revealed that 62.9 percent of the respondents utilized the internet most frequently. The number of RFPS who reported using the internet to search for nutrition information implies that they perceive it as an influential means for upgrading their nutrition knowledge.

In addition, most studies have reported the media, especially television, as the most appropriate source for disseminating nutrition information (Aihara & Minai, 2011; Charlton et al., 2004; Zoellner et al., 2009). It is, however, important to find out that the RFPS also consult cookbooks and nutrition textbook for nutrition information. This could also mean the respondents have high reading culture and are comfortable reading professional printed materials.

Combination of Top Five Sources of Nutrition Information

Individuals are known to consult more than one source when they search for information. In this study, an effort was made to identify the number of information sources the respondents used on the average. It was revealed that on the average the RFPS combined about 4 sources ($M=3.79$) out of the 12 possible sources. Additionally, the specific information sources combined by RFPS to seek nutrition information were analysed. This analysis was, however, limited to the top five sources otherwise described as the popular sources for ease of analysis and interpretation. The detailed percentages of respondents using different combinations of information sources are presented in Table 11.

Table 11: Combination of Top Five Information Sources

Possible Source Combination	N	Percent
Television and Internet	48	9.66
Television, Radio and Internet	43	8.65
Television, Internet, Nutrition textbook and Cookbook	35	7.04
Television, Radio, Internet, Nutrition textbook and Cookbook	34	6.84
Internet, Nutrition textbook and Cookbook	28	5.63
Internet and Nutrition textbook	27	5.43
Television and Radio	20	4.02
Television, Internet and Nutrition textbook	14	2.82
Television, Radio, Internet and Nutrition textbook	13	2.62
Internet and cookbook	12	2.41
Television, Internet and Cookbook	11	2.21
Television and Nutrition textbook	11	2.21
Television, Radio and Nutrition textbook	10	2.01
Nutrition textbook and Cookbook	10	2.01
Television, Radio, Internet and Cookbook	8	1.61
Television and Cookbook	4	0.80
Television, Nutrition textbook and Cookbook	4	0.80

Table 11 Continued

Television, Radio, Nutrition textbook and Cookbook	3	0.60
Radio and Internet	3	0.60
Radio and Nutrition textbook	3	0.60
Radio, Internet, Nutrition textbook and Cookbook	1	0.20
Radio, Internet and Cookbook	1	0.20
Television, Radio and Cookbook	1	0.20
*Only Internet	58	11.67
*Only Television	30	6.04
*Only Nutrition textbook	11	2.21
*Only Cookbook	9	1.81
*Only Radio	3	0.60
*None of the five sources	42	8.45
Total	497**	100.00

Source: Field survey, Addison (2018)

Note: * not included in the interpretation**multiple responses apply

It was observed that the RFPS used more than one type of information source. There were 23 possible combinations in all. Television appeared in 15 different combinations, the internet appeared in 14, Cookbooks and Nutrition textbooks appeared in 13, and the Radio in 12, out of the 23 combinations. The combinations were typically in duos, trios, and quads. The internet and television emerged as the top duo combination (9.66%) mentioned by the respondents.

Additionally, among the trio combinations, the television, radio and internet (8.65%) were revealed as the top combination. Similarly, the television, internet, nutrition textbook and cookbook (7.04%) topped the quad combinations. Thus, the television appeared in all the top combinations. The television is often used as an information source by those who want to get information in a leisurely manner. In Ghana, currently, there are several programmes on television educating their audience about cookery and nutrition. These programmes have some elements of entertainment; therefore, the

audience could receive the information without actively engaging their cognitive abilities. Further, approximately 7 percent of the RFPS consulted all the five sources in their search for nutrition information. These findings suggest that the decision to use one source makes it more likely that another source would be used.

Popular Information Sources by Socio-demographic and Employment Characteristics

The Chi-square Test of Independence was employed to explore the relationship between the top five information sources on nutrition and respondents' socio-demographic variables such as sex, age, marital status and educational attainment. The analysis was however limited to the five sources identified as the leading sources and presented in Table 12. The Chi-square statistic showed that a statistically significant relationship existed between information sources and age ($\chi^2 = 80.87$; $p < 0.050$). Specifically, the results revealed that the internet and television usage marginally decreased by age, even though these two sources were mostly used across all the age categories. For instance, the proportion of the under 24 years (64.5%) who reported using the television were more than those within the 25 to 34 years (63.3%) and above 35 years (62.5%). Further, the results showed that the above 35 years cohort tended to dominate the use of nutrition textbooks (48.7%) and cookbooks (50.0%) for nutrition information.

Educational attainment was another variable that was found to have statistically significant indication of a relationship with the use of the sources for nutrition information ($\chi^2 = 156.38$; $p < 0.002$). Again, the internet and

television emerged as the dominant sources across all the levels of educational attainment. However, it was revealed that while the internet users tended more to be respondents with the highest level of education (Polytechnic; 84.5% and University; 85.0%, respectively), television users were more likely to be RFPS who had completed Primary/JHS (73.8%). Further, those who had completed Vocational training tended to combine nutrition textbooks and cookbooks when searching for nutrition information. Finally, the proportion of SHS graduates (36.3%) who used the Radio were more than the other education categories.

Table 12: Popular Information Sources by Socio-demographic Characteristics

Characteristics	N	Sources					χ^2 (p-value)
		Int.	Tv.	TxtBk.	CB.	Rad.	
Sex							
Male	181	79.6	63.5	41.9	30.9	30.9	19.64
Female	274	70.1	63.5	46.7	38.3	31.7	(0.845)
Age							
<24	124	74.2	64.5	45.2	32.3	40.3	80.87
25-34	251	73.7	63.3	43.4	32.3	27.9	(0.010)*
35+	80	73.7	62.5	48.7	50.0	28.7	
Marital status							
Single	323	73.4	62.8	45.5	33.7	30.9	16.77
Married	132	75.0	65.1	43.2	39.4	32.6	(0.936)
Education							
Primary/JHS	42	66.7	73.8	19.0	11.9	21.4	156.38
SHS	157	68.1	61.1	46.5	24.8	36.3	(0.002)**
Vocational	93	67.7	61.3	50.5	47.3	26.8	
Polytechnic	123	84.5	65.8	47.9	47.1	33.3	
University	40	85.0	60.0	42.5	37.5	27.5	

Source: Field survey, Addison (2018)

Note: *significant at $p < 0.050$; **significant at $p < 0.010$

N: All respondents who reported using at least one of the five sources

Int.: Internet; Tv.: Television; TxtBk.: Nutrition Textbook; CB.: Cookbook;

Rad.: Radio

The data suggested that there was no significant relationship between gender and nutrition information sources. This, therefore, implies that males and females largely relied on the same sources for nutrition information. For instance, both males and females equally relied on television and radio for nutrition information. However, a few patterns were observed. While males were noted to rely mostly on the internet (79.6%), their female counterparts regularly relied on nutrition textbooks (46.7%) and cookbooks (38.3%).

Regarding the employment characteristics of the respondents and source usage, several significant relationships were revealed. For instance, there is a statistically significant indication to support a relationship between the type of restaurant the respondents worked for and the use of the sources for nutrition information ($\chi^2 = 48.92$; $p < 0.006$). Except for nutrition textbooks, the respondents working in hotel restaurants tended to be proportionally dominant in the use of all the sources. Whereas staff of the hotel restaurants tended to combine the internet (75.3%), television (66.3%), cookbooks (42.3%), and the radio (32.9%), their counterparts in the independent restaurants dominated the use of the nutrition textbooks (48.0%).

Additionally, there is a very strong evidence to support the association between industry experience and the nutrition information source usage ($\chi^2 = 84.11$; $p < 0.005$). It was further revealed that the respondents who have worked in the food service industry between 6 and 10 years dominated the use of the internet (77.1%), nutrition textbooks (53.0%) and the radio (32.5%). Adding to this, respondents with more than 11 years of industry experience tended to combine television (66.7%) and cookbooks (54.2%).

Furthermore, the results revealed that hours of in-service training for nutrition requirements was significantly associated with the sources of nutrition information ($\chi^2 = 68.90$; $p < 0.039$). As can be seen from Table 13, there is a strong evidence that respondents who received 3 to 6 hours of nutrition training on the job tended to combine the internet (81.3%) and the television (72.0%).

Table 13: Popular Information Sources by Employment Characteristics

Characteristics	N	Top Five Sources					χ^2 (p-value)
		Int.	Tv.	TxtBk	CB	Rad.	
Restaurant type							
Independent	200	72.0	60.0	48.0	26.5	29.5	48.92
Hotel	255	75.3	66.3	42.3	42.3	32.9	(0.006)**
Employment type							
Regular	351	72.9	62.9	46.7	38.2	31.0	28.91
Temporary	104	76.9	65.4	38.5	25.9	32.7	(0.365)
Years worked in the Industry							
1-5years	324	74.7	63.9	41.7	31.8	31.2	84.11
6-10 years	83	77.1	60.2	53.0	38.5	32.5	(0.005)**
11+ years	48	62.5	66.7	52.1	54.2	31.2	
Current position							
Head Chef	41	82.9	58.5	53.7	58.5	34.1	59.39
Sous Chef	57	82.5	73.7	42.1	38.6	29.8	(0.286)
Line Cook	357	71.4	62.5	44.3	32.2	31.4	
Years worked in current position							
1-5years	390	76.1	63.8	43.1	33.3	32.0	63.56
6-10 years	52	59.6	59.6	57.7	46.1	26.9	(0.175)
11+ years	13	61.5	69.2	46.1	53.8	30.8	
In-service nutrition raining							
<3 hours	136	75.0	68.4	41.9	34.6	41.9	68.90
3-6 hours	75	81.3	72.0	48.0	36.0	26.7	(0.039)*
7+ hours	45	71.1	71.1	48.9	42.2	28.9	

Source: Field survey, Addison (2018)

Note: *significant at $p < 0.050$; **significant at $p < 0.010$

N: All respondents who reported using at least one of the five sources

Int.: Internet; Tv.: Television; TxtBk.: Nutrition Textbook; CB.: Cookbook;

Rad.: Radio

In addition, the use of the nutrition textbooks (48.9%) and cookbooks (42.2%) for nutrition information was dominant among respondents who had received more than 7 hours of nutrition training. Lastly, respondents who received less than 3 hours of nutrition training (41.9%) on the job dominated the use of the Radio.

An attempt was made to understand the characteristics of the RFPS who dominate the use of the top five sources. The empirical results from the Chi-square Test revealed the proportionally dominant groups with regard to the use of the top five sources for nutrition information or messages across their socio-demographic and employment characteristics. These relationships paint a picture of respondents who are most likely to be reached through any of the five sources given their profiles.

Conclusively, the fact that the internet, extensively, has become the most frequently used source to seek both general and tailored information was demonstrated in this study. Nonetheless, traditional offline sources are still favoured by the RFPS, because they often use multiple sources simultaneously in seeking nutrition information. This possibly means that the internet has come to compliment the offline sources.

Furthermore, males were more inclined towards the use of the internet than the females even though the analysis was not significant. This is worthy of mention because the females dominated this study. This finding is in line with both global and national internet usage rates among males and females. The global internet usage rate indicates that male population (24.9%) in Africa dominated internet usage in 2017 (Statista, 2017). Again, the 2010 census summary report revealed that males were more likely to own mobile phones and

use the internet than females irrespective of locality and region of residence (GSS, 2013). In terms of sex, usage of the internet among males was reportedly higher than among the females. For every 2 males who use the internet in any region, 1 female used the facility (GSS, 2013).

As expected, in this study, the Vocational and Polytechnic graduates dominated in the use of the nutrition textbooks and cookbooks for nutrition information. The Vocational and Polytechnic curriculum are known to promote practical learning among the students. As such, for respondents with such educational background, it is possibly a common practice to consult nutrition textbooks and cookbooks. This behaviour is likely to be transferred to the work environment when they are challenged with tasks that require reference to some information source.

Chapter Summary

This chapter discussed issues regarding respondents' profile and sources from which RFPS receive nutrition information. This section also looked at the sole usage and the type of sources combined by the respondents to seek nutrition information. The study revealed five leading sources of nutrition information, namely: the internet, television, nutrition textbooks, cookbooks and the radio which were mostly used in several combinations (i.e. duos, trios and quads). The relationship between the popular nutrition information source utilisation and the respondents' profile was also explored. Age, education, restaurant type, years worked in the industry, and in-service nutrition training were found to have statistically significant relationship with the popular sources of nutrition information. Following from this chapter, the next chapter focussed on the effort

the RFPS put in their search for nutrition information. Trust, reliability, expertise, clarity, and accessibility, as factors determining the preference for a nutrition information source were also explored.



CHAPTER SIX

INFORMATION NEED, SEARCH EFFORT AND BARRIERS TO INFORMATION SEEKING

Introduction

This chapter focusses on the effort RFPS' put into their search for nutrition information. Firstly, information need is established and then source attributes (reliability, expertise, clarity, accessibility, and trust) are also explored to reveal the respondents' source preferences. Further, trust and time committed to the nutrition information sources were explored in relation to the socio-demographic and employment characteristics of the RFPS'. The chapter ends with an examination of barriers to and confidence in seeking nutrition information.

Nutrition Information Need

Information search has already been defined in this study as a purposeful pursuit of information. The RFPS were asked to indicate the topics which are relevant to them, as well as whether they needed more information on those topics than they already knew or not. The food and nutrition topics were adapted from Van Dillen et al. (2004). According to Worsley (2002), people always make it a point to seek more knowledge about what interests them. Hence, without an appreciation of the topics RFPS consider relevant in their case, it would be almost ineffective targeting them with specific nutrition information or interventions. Fourteen food and nutrition topics were ranked in order of perceived relevance (Table 14).

Table 14: Perceived Importance of the Food and Nutrition Topics

Food and nutrition topic	N	Percent
Extremely important		
Balanced diet	406	81.7
Food hygiene	370	74.4
Food safety	299	60.2
Fruits and vegetables	290	58.3
Moderately important		
Nutrient retention	229	46.1
Eating less fat	226	45.5
Lowering cholesterol	204	41.0
Preparing and storing	199	40.0
Food		
Important		
Food allergy	181	36.4
Carbohydrates	178	35.8
Vitamins	175	35.2
Weight loss	165	33.2
Minerals	150	30.2
Food composition	131	26.4

Source: Field survey, Addison (2018)

Note: N=3203 (multiple responses apply)

As evident from Table 14, the respondents identified four topics which have been classified as extremely important. They are balanced diet (81.7%), food hygiene (74.4%), food safety (60.2%) and fruits and vegetables (58.3%).

Apart from the first set of topics, the respondents also identified four other topics, namely: nutrient retention (46.1%), eating less fat (45.5%), lowering cholesterol (41.0%) and preparing and storing food (40.0%) as moderately important. The last set of topics they identified could be classified as important. They include food allergy (36.4%), carbohydrates (35.8%), vitamins (35.2%), weight loss (33.2%), minerals (30.2%), and food composition (26.4%).

Further, the respondents were asked if they needed more information about the topics they identified as relevant. Approximately 96 percent of the respondents expressed a need for more information on the topics they identified as important (Figure 11).

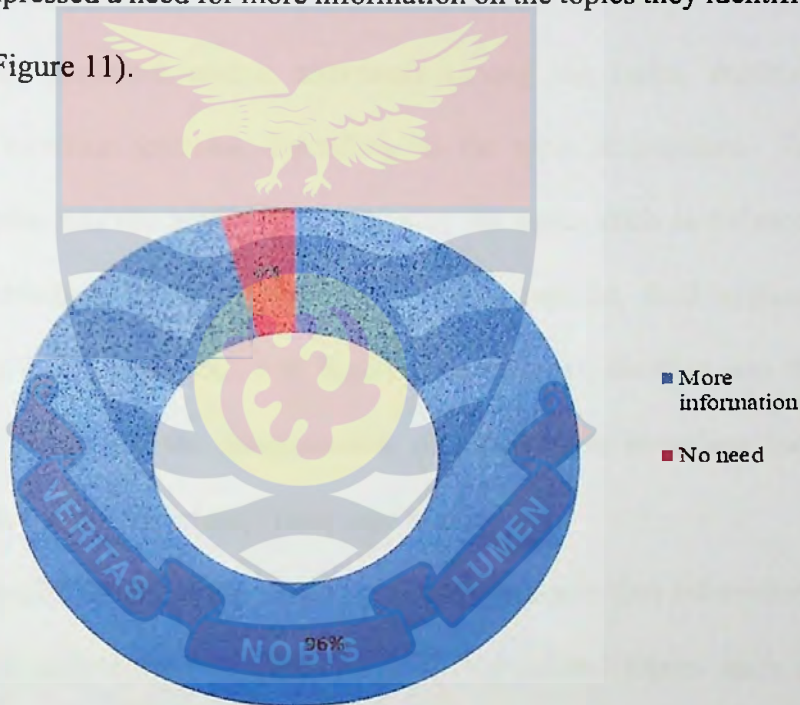


Figure 11: Perceived Information Need among Respondents

Source: Field survey, Addison (2018)

The findings suggest that there is a need to provide more information on these topics, especially the ones considered as important and moderately important. Besides, it is the recognition of a need that necessitates information

seeking which might contribute to understanding and meaning (Ikoja-Odongo & Mostert, 2006; Kuhlthau, 1993).

Information Source Preference

Respondents were asked to indicate which sources they would prefer the specific food and nutrition-related topics perceived as important to be channelled through to them. The frequently identified sources are summarised in Table 15. Television and the internet emerged as the most preferred sources identified by the respondents.

The next preferred source alternated among the radio, dietitian, cookbook and nutrition textbook depending on the topic in question. For instance, the radio was the preferred third source for topics such as balanced diet, nutrient retention, fruits and vegetables, eating less fat, food hygiene, lowering cholesterol, weight loss, and food safety, whereas, dietitian was the preferred third source for the dissemination of information regarding food nutrients such as vitamins, carbohydrates, and minerals.

As shown in Table 15, the respondents who seek nutrition information mainly look for information on nutrition and food-related topics such as balanced diet, food hygiene, food safety, fruits and vegetable, nutrient retention, eating less fat, lowering cholesterol, and preparing and storing food. The main sources for this kind of information are the internet, television and radio.

To promote good nutrition, it is necessary to identify the sources from which individuals seek nutrition information and the extent to which reliable sources are used (Holgado et al., 2000). Silk et al. (2008) suggested that sending nutrition information through effective channels is an important issue in the

promotion of good health. This is important because individuals have their preferred sources that they contact for nutrition information (Silk et al., 2008).

Table 15: Preferred Sources of Nutrition Information

Topic	Source 1	Source 2	Source 3
Balanced diet	Television	Internet search	Radio
Nutrient retention	Television	Internet search	Radio
Fruits & vegetables	Television	Internet search	Radio
Eating less fat	Television	Internet search	Radio
Food hygiene	Television	Internet search	Radio
Preparing & storing meals	Internet search	Television	Cookbook
Vitamins	Internet search	Television	Cookbook
Carbohydrates	Television	Internet search	Nutrition textbook
Minerals	Television	Internet search	Dietitian
Lowering cholesterol	Television	Internet search	Radio
Losing weight	Television	Internet search	Radio
Food safety	Television	Internet search	Radio
Food composition	Television	Internet search	Cookbook
Food allergy	Internet search	Television	Nutrition textbook

Source: Field survey, Addison (2018)

Closely related to information sources are their attributes in terms of reliability, expertise, clarity, and accessibility. These source attributes have often been mentioned in the literature as reasons for favouring an information source (Cash et al., 2015; Marquis et al., 2005; Rowe, 2002; Van Dillen et al., 2004). In this study, respondents were asked to indicate which sources they perceived to be most reliable. In the same regard, the respondents were asked to match expertise, clearness, and accessibility to the information sources.

Table 16: Ranking of Perceived Attributes Assigned to Nutrition

Source	Information Sources				Overall rank
	Reliable (%)	Expertise (%)	Clearness (%)	Accessible (%)	
Internet	21.7	15.2	14.9	23.8	1
Television	18.6	13.3	21.2	16.4	2
Nutrition textbooks	13.3	10.7	11.0	11.7	3
Cookbooks	10.0	8.6	8.3	7.8	4
Radio	8.3	7.4	9.8	8.4	5
Colleagues	6.5	5.3	8.5	8.8	6
Supervisor	5.1	8.2	7.0	5.8	7
Doctor	4.6	12.8	4.2	3.4	8
Dietitian	4.5	11.2	3.3	3.3	9
Friends/family	3.7	2.9	5.2	5.8	10
Magazines	2.2	2.7	4.1	3.4	11
Newspapers	1.6	1.7	2.6	1.4	12

Source: Field survey, Addison (2018)

Table 16 presents the respondents' ranking of different sources of information on food and nutrition based on their attributes. The internet, television and nutrition textbook ranked among the highest. However, relative to the specific sources, some differences were observed concerning each attribute. For perceived expertise, respondents ranked doctors third. Respondents also rated colleagues fourth for perceived accessibility. This variation implies that sometimes the RFPS' utilize nutrition information about some nutrition topics from sources that they do not perceive as the expert or easily accessible.

Furthermore, the respondents were asked to indicate their level of trust in the nutrition information sources. This was to find out if the most trusted sources were the most utilized sources. Also, to a large extent, individuals are known to trust information sources perceived to have the attributes of reliability, expertise, clarity and accessibility. The respondents accorded different degrees of trust to the various sources of nutrition information.

Results from Table 17 indicates that trust placed in the twelve nutrition information sources in the study ranges from high to very high. Respondents were found to place very high trust in nutrition information sources such as doctors (M=4.76), dietitian (M=4.67), nutrition textbooks (M=4.53), and the internet (M=4.49). Besides these, respondents expressed relatively high trust in the remaining sources: cookbooks (M=4.39), supervisors (M=4.33), television (M=4.25), radio (M=4.04), colleagues (M=3.93), friends/family (M=3.77), newspapers (M=3.69), and magazines (M=3.64).

This indicates that, largely, RFPS place high trust in all the nutrition information sources. What is striking, however, is that only 6.0 and 5.3 percent

of respondents received nutrition information from doctors and dietitian respectively as earlier reported in Chapter five; yet, they placed very high trust in these sources (M=4.76; M=4.67 accordingly). In any case, notionally, doctors are considered credible and trustworthy. So, it was not surprising that majority of the respondents considered doctors as credible even though doctors were not frequently utilised by the respondents during their search for nutrition information.

Table 17: Level of Trust in Nutrition Information Sources

Trust in nutrition information Source	N	M ^a	SD ^b
Television	291	4.25	0.78
Radio	146	4.04	0.84
Internet	338	4.49	0.68
Colleagues at work	133	3.93	0.83
Supervisor	120	4.33	0.71
Friends/family	93	3.77	0.93
Doctor	107	4.76	0.48
Dietitian	96	4.67	0.53
Nutrition textbooks	205	4.53	0.63
Cookbooks	162	4.39	0.73
Newspapers	43	3.69	0.88
Magazines	64	3.64	0.87

Source: Field survey, Addison (2018)

1= Very low, 2= Low, 3= Average, 4= High, and 5= Very high

Note: ^a mean; ^b standard deviation

Besides, most studies (Cash et al., 2015; Charlton et al., 2004; Ndahura, 2012) have reported doctors and other health professionals as the most trusted source for information yet they are not typically consulted by the majority for nutrition information. Moreover, anecdotal evidence in Ghana suggests that doctors and dietitians are not directly involved in the dissemination of nutrition information related to commercial food production. They are known for influencing general medical health and personal well-being at a high cost, accounting for the reason why these two sources were less utilised by the RFPS.

Additionally, Table 17 indicates that respondents placed relatively more trust in nutrition textbooks (M=4.53) than in the internet (M=4.49) and television (M=4.25) which were revealed in chapter five to have ranked as the first and second most utilised sources respectively. This finding could be attributed to the difficulty in verifying the credibility of non-scientific information disseminated through the internet and television. In contrast, Nutrition textbooks generally promote trust in users because they are well-indexed and usually contain facts that provide valid answers to nutrition-related issues. Similarly, respondents trusted the sixth utilised source (supervisor) relatively higher (M=4.33) than television (M=4.25), which was the second most utilised source. This is probably because the RFPS see their supervisors as experts who possess the right technical skills and are qualified enough to guide them to perform their tasks effectively.

Trust just like the other attributes influences an individual's source preference. This section explores the variations in level of trust across the various socio-demographic and employment characteristics. Two statistical techniques were employed to explore the variations across the respondents'

socio-demographic characteristics. These are the One-way between groups ANOVA and the Independent Samples T-test. Post-hoc tests were conducted using Tukey t-test to compare trust among the top five sources across the socio-demographic and employment characteristics to determine where the significant differences exist. The analysis was limited to the top five sources for easy presentation and interpretation of findings. Also, the analysis was based on the five-point Likert scale format that was used to capture the data. The scale ranged from very high to very low, and the findings are presented in Table 18.

Table 18: Trust in Nutrition Information Sources by Respondents' Socio-demographic Characteristics

Characteristic	Trust in Nutrition Information Sources				
	Internet	Television	Textbook	Cookbook	Radio
Sex					
Male	4.57	4.24	4.42	4.24	4.03
Female	4.43	4.25	4.59	4.47	4.05
t	1.89	0.16	1.80	1.92	0.14
(p-value)	(0.058)*	(0.866)	(0.072)	(0.055)*	(0.884)
Age					
<25	4.41	4.28	4.54	4.35	3.92
25-34	4.54	4.30	4.51	4.43	4.14
35+	4.44	4.04	4.56	4.35	4.04
F	1.20	2.23	0.10	0.26	0.99
(p-value)	(0.301)	(0.109)	(0.902)	(0.769)	(0.375)
Marital status					
Single	4.46	4.21	4.52	4.32	4.00
Married	4.55	4.32	4.56	4.54	4.16
t	1.11	1.05	0.41	1.82	1.05
(p-value)	(0.266)	(0.291)	(0.680)	(0.070)	(0.292)
Education					
Primary/JHS	4.39	4.03 ^{a1}	4.37	4.00	4.00
SHS	4.52	4.50 ^{a1}	4.55	4.46	4.30 ^{a1}
Vocational	4.34	4.01 ^{a2}	4.46	4.45	3.73 ^a
Polytechnic	4.53	4.20	4.55	4.36	3.95
University	1.26	4.20	4.58	4.26	3.81
F	4.79	4.79	0.32	0.65	2.72
(p-value)	(0.286)	(0.000)**	(0.866)	(0.626)	(0.032)*

Source: Field survey (2018)

1= Very low, 2= Low, 3= Average, 4= High, and 5= Very high

Note: *significant at $p < 0.050$; **significant at $p < 0.010$

^{a, a1, a2} where the significant differences exist

Evidence from Table 18 shows that there were some statistically significant differences observed within sex, education, regarding respondents' level of trust in nutrition information from the internet, television, cookbook and the radio. Significant differences were found by sex regarding trust in nutrition information from the internet and cookbooks. Specifically, there was a significant difference ($t=1.89$; $p=0.058$) regarding trust in the internet between males and females. Accordingly, males and females differed in terms of their trust in the internet as a source of nutrition information. The results showed that male respondents placed very high trust in the internet ($M=4.57$) compared to the female counterparts ($M=4.43$) who placed just high trust in the internet.

Still, among sex, there was a statistically significant difference in trust in cookbooks among male and female respondents ($t=1.92$; $p=0.055$). The results revealed a marginal mean difference between males ($M=4.24$) and females ($M=4.47$) regarding trust in cookbooks. Even though both male and female respondents placed high trust in cookbooks, the female respondents were more trusting.

The finding, therefore, suggests that males had more trust in the internet, whereas the females had more trust in cookbooks. This may be due to the fact that, until recently, the field of cookery in Ghana was dominated by females. They were, therefore, exposed to the cookbooks and would consult them for recipes before the advent of the internet. In addition to the above, there is a digital gender gap which is highly skewed towards males in the developing countries in terms of general access to the internet (Statista, 2017).

This predisposes the males to the internet for information. Males who have ventured into the domain of cookery would logically find it easy to consult

the internet sources than the females. More substantively, females are known to exercise caution and seek clarification on most issues before taking a decision. Therefore, they are likely to endorse the cookbook as a credible source of nutrition information than the internet. This result also confirms an earlier finding (Chapter five) in this chapter that males associates more with the use of the internet than their female counterpart.

A one-way ANOVA was conducted to determine if trust in nutrition information sources was different for groups with different level of educational. The analysis of variance revealed that trust in television and radio significantly varied by educational attainment. Specifically, there was a statistically significant difference in trust in television within the respondents' educational attainment ($F=4.79$; $p=0.000$). The variations in trust were observed among respondents who had completed SHS ($M=4.50$) and those who had attained Primary/JHS ($M=4.03$), and between SHS and Vocational training ($M=4.01$). The results further showed that respondents who had completed SHS placed relatively very high trust in television than the other respondents who congruently placed only high trust in television as a nutrition information source.

Statistical differences were also observed regarding trust in radio and educational attainment of respondents ($F=2.72$; $p=0.032$). Again, the Tukey post-hoc test revealed that although they all placed high trust in radio, it was observed to be significantly higher in respondents who had completed SHS ($M=4.30$) than the respondents who had completed Vocational training ($M=3.73$). The finding suggests that RFPS with less educational attainment

consider Radio as more credible sources for learning about nutrition-related issues in comparison to other RFPS with higher educational attainments.

Table 19: Trust in Nutrition Information Sources by Respondents' Employment Characteristics

Characteristic	Trust in Nutrition Information Sources				
	Internet	Television	Textbook	Cookbook	Radio
Restaurant type					
Independent	4.46	4.28	4.55	4.44	3.95
Hotel	4.51	4.22	4.51	4.37	4.11
t	0.67	0.70	0.42	0.60	1.17
(p-value)	(0.500)	(0.479)	(0.668)	(0.546)	(0.243)
Employment type					
Regular	4.49	4.30	4.54	4.40	4.03
Temporary	4.46	4.08	4.48	4.35	4.08
t	0.33	2.00	0.49	0.29	0.30
(p-value)	(0.741)	(0.045*)	(0.623)	(0.764)	(0.764)
Industry experience					
1-5years	4.46	4.23	4.50	4.42	4.00
6-10 years	4.54	4.40	4.65	4.31	4.25
>10 years	4.56	4.09	4.48	4.38	4.00
F	0.54	1.59	1.13	0.28	1.02
(p-value)	(0.583)	(0.205)	(0.325)	(0.757)	(0.361)
Current position					
Head chef	4.76 ^a	4.08	4.59	4.37	3.92
Sous chef	4.44	4.21	4.50	4.47	4.00
Cook	4.46 ^a	4.27	4.52	4.38	4.06
F	3.06	0.71	0.13	0.15	0.20
(p-value)	(0.048)*	(0.492)	(0.882)	(0.862)	(0.818)

Source: Field survey (2018)

1= Very low, 2= Low, 3= Average, 4= High, and 5= Very high

Note: *significant at $p < 0.050$; **significant at $p < 0.010$

^a, ^{a1}, ^{a2} where the significant differences exist

In addition to the above, statistically significant differences were observed between respondent's employment characteristics regarding trust in the top five sources. Specifically, the t-test conducted to determine if there were differences in trust in television based on employment type showed significant

difference between the groups ($t=2.00$; $p=0.045$). RFPS who were engaged on regular or permanent basis ($M=4.30$) differed in terms of trust in television from their counterparts who were temporary staff ($M=4.08$). Although both response groups trusted television highly, the permanent staff were relatively more trusting.

Further, the analysis revealed statistically significant difference in trust in the internet between groups occupying different positions as determined by One-way ANOVA ($F=3.06$, $p=0.048$). A Tukey post-hoc test revealed that trust in the internet was statistically higher among head chefs ($M=4.76$) compared to the cooks ($M=4.46$). This finding suggests that head chefs placed relatively more trust in the internet as compared to their subordinates.

The findings in this section have confirmed that trust in sources among RFPS differs across the socio-demographic and employment characteristics. For instance, trust in the internet, television, cookbook, and radio as nutrition information sources varied by sex, educational attainment, employment type, and respondents' current position. However, there were no significant variations observed across some of the socio-demographic and employment characteristics. For instance, trust in the top five sources did not vary by respondents' age, marital status, restaurant type and industry experience. This, therefore, implies that the respondents with such backgrounds, probably, trust the sources equally.

Time Committed to Nutrition Information Sources

This study also examined the general use of nutrition sources by asking respondents to indicate the time they spent searching for nutrition information

from each of the sources they utilize. For easy interpretation, the unit of measurement used for the analysis was minutes per day (m/d). Earlier findings from this study suggest that the internet is the most frequently used source of nutrition information among RFPS in Ghana. As regards time, it was revealed that the respondents spent on the average 103.6m/d searching for nutrition information from the internet and 100.6 m/d from nutrition textbooks (Table 20). There is an evidence that RFPS commit nearly the same time searching for nutrition information from both the internet and nutrition textbooks.

Table 20: Source Usage by Time (minutes per day)

Source	N	M/d	SD
Internet	336	103.6	66.8
Television	289	72.8	43.4
Nutrition textbooks	204	100.6	66.0
Cookbooks	161	84.7	54.6
Radio	143	71.8	105.3
Colleagues at work	131	68.3	63.7
Supervisor	117	68.6	67.1
Doctor	105	67.0	38.2
Dietitian	94	74.3	47.9
Friends/family	90	60.1	51.8
Magazines	60	59.6	40.4
Newspapers	40	39.8	25.9

Source: Field survey, Addison (2018)

Respondents also designated more time reading from cookbooks (M=84.7, SD=54.6 m/d) than viewing television (M=72.8, SD=43.4 m/d) or listening to radio (M=71.8, SD=105.3m/d) for nutrition information. Overall,

there is a possible indication that the respondents commit more time to non-print sources than the print sources.

Further analysis revealed some interesting patterns concerning the time commitment of respondents shaped by socio-demographic and employment characteristics. The variations in time committed to nutrition information sources across the respondents' socio-demographic characteristics were explored using the One-way ANOVA and the Independent Samples T-test. It has been proven by far that the most reliable sources are the top five sources. For this reason, the analysis was limited to these sources for consistency, ease of presentation and interpretation of the findings (Table 21).

Table 21 suggests that there were some statistically significant differences within marital status and educational attainment with regard to time commitment by respondents to nutrition information search from nutrition textbooks, cookbooks, and the radio. Table 21 shows that significant differences existed among the groups in terms of time commitment in search of nutrition information from cookbooks ($t=2.44$, $p=0.015$). Evidence suggests that respondents who were married spent more time ($M=99.8m/d$) searching from cookbooks than respondents who were not married ($M=77.6m/d$).

The possible explanation to this finding is that the married group are exercising duty of care towards their customers which is an extension of the responsibilities they carry out at home. For most people, marriage ignites some sense of responsibility towards the health of the people in their care. Cookbooks contain food recipes and other nutrition information which simplify the act of cookery. They, therefore, commit more time to cookbooks than their unmarried counterparts. Additionally, RFPS who were married typically have the

responsibility of cooking for their spouses and in some cases their children on daily basis. Owing to this, they are compelled to search for recipes from cookbooks, hence spending more time using this source.

Table 21: Time Committed to Nutrition Information Search by Socio-demographic Characteristics

Characteristics	Time Committed to Information Sources				
	Internet	Television	Textbook	Cookbook	Radio
Sex					
Male	105.2	73.0	93.7	92.5	76.1
Female	102.5	72.7	104.6	80.6	69.0
t	0.37	0.05	1.14	1.32	0.39
(p-value)	(0.706)	(0.956)	(0.253)	(0.186)	(0.696)
Age					
<25	106.6	77.0	105.5	83.3	60.0
25-34	103.0	71.1	96.4	77.8	68.0
35+	101.1	71.7	105.1	100.2	109.1
F	0.15	0.50	0.46	2.31	1.82
(p-value)	(0.865)	(0.607)	(0.632)	(0.102)	(0.165)
Marital status					
Single	102.5	73.2	103.0	77.6	60.7
Married	106.3	71.9	94.2	99.8	97.6
t	0.46	0.22	0.84	2.44	1.73
(p-value)	(0.642)	(0.820)	(0.396)	(0.015)**	(0.054)*
Education					
Primary/JHS	93.7	66.9	63.1	44.0	41.6
SHS	111.0	78.9	114.9 ^a	93.7	68.7
Vocational	107.8	71.6	105.1 ^{al}	82.0	77.8
Polytechnic	97.5	71.7	83.2	82.7	84.6
University	99.7	62.9	104.7	91.0	51.3
F	0.79	0.94	2.68	1.05	0.46
(p-value)	(0.531)	(0.439)	(0.032)*	(0.380)	(0.761)

Source: Field survey, Addison (2018)

Note: *significant at $p < 0.050$; **significant at $p < 0.010$

^a, where the difference occurs

Similarly, the results showed that respondents who were married committed significant time ($M=97.6m/d$) towards information search from the radio compared to their unmarried counterparts ($M=60.7m/d$). In Ghana, there are a number of cook shows aired on the radio which equip listeners with cooking skills. With their commitment towards their families, most married

people are more likely to listen to the radio to learn about nutrition. This could explain the difference in the time commitment towards the use of radio as a source of nutrition information.

Generally, the time allotted to information sources did not vary significantly by educational attainment except the time the different educational groups devoted to information search from cookbooks. There was a statistically significant difference between educational groups as determined by one-way ANOVA ($F=2.68$, $p=0.032$). A post-hoc test revealed that time commitment towards reading from a cookbook was significantly higher among respondents who had completed SHS compared to those who had completed a vocational training. It is possible that the respondents who had completed SHS still had the habit of consulting books as their reference point. They probably do so when they are faced with any difficulty – spot solution. This could explain the reason why they spent more time searching from cookbooks compared to their counterparts who had completed a vocational training.

Further analysis was conducted to test if there were variations in time commitment to nutrition information sources based on their employment characteristics using Independent samples t-test and one-way ANOVA. The results showed that the time devoted to the internet, television, cookbooks, and the radio differed by respondents' employment type, industry experience and current position (Table 22).

The Independent samples t-test revealed a significant difference regarding time devoted to the internet between regular and temporary staff ($t=2.09$; $p=0.037$). The results further indicated that regular food production

staff spent more time (M=107.6m/d) on the internet than the temporary staff (M=90.1m/d).

Table 22: Time Committed to Nutrition Information Search by Employment Characteristics

Characteristics	Time Committed to Information Sources				
	Internet	Television	Textbook	Cookbook	Radio
Restaurant type					
Independent	97.5	74.8	108.9	80.4	69.6
Hotel	108.3	71.4	93.1	86.8	73.3
t	1.46	0.65	1.71	0.70	0.20
(p-value)	(0.143)	(0.510)	(0.088)	(0.484)	(0.835)
Employment type					
Regular	107.9	71.7	102.6	86.0	74.0
Temporary	90.1	76.5	92.1	78.7	64.7
t	2.09	0.79	0.90	0.63	0.451
(p-value)	(0.037)*	(0.426)	(0.364)	(0.527)	(0.652)
Industry experience					
1-5years	102.5	72.0	97.3	78.4 ^{a1}	61.4 ^{b1}
6-10 years	103.6	69.9	98.2	68.7 ^{a2}	67.4 ^{b2}
>10 years	113.0	82.6	122.4	129.6 ^a	150 ^b
F	0.33	0.96	1.56	12.36	4.90
(p-value)	(0.772)	(0.383)	(0.212)	(0.000)**	(0.008)**
Current position					
Head chef	107.9	51.4 ^{a1}	85.9	98.1	134.2 ^b
Sous chef	88.8	73.5	92.7	102.5	52.6 ^{b1}
Cook	105.8	75.0 ^a	103.8	78.6	66.9 ^{b2}
F	1.37	3.24	0.91	2.66	2.94
(p-value)	(0.255)	(0.040)*	(0.405)	(0.073)	(0.056)*

Source: Field survey, Addison (2018)

*significant at $p < 0.050$; ** significant at $p < 0.010$

^{a,b} where differences occur

This result is expected because the regular staff dominated the study. More substantively, unlike the temporary staff who are engaged as and when their assistance is needed, the regular staff handle more responsibilities on daily basis which is dependent on information. That is, they are more likely to show high level of commitment towards the organisation as compared with the

temporary staff. They, therefore, search for more information to be able to handle their responsibilities effectively. Besides, the internet provides immediate solutions to their problem because of the convenience it affords the information consumer.

Furthermore, the analysis of variance revealed statistically significant differences in the time committed to reading from a cookbook and listening to the radio for nutrition information in terms of differences in work experience. Specifically, a marked variation existed in time devoted to reading from a cookbook in terms of experience in the industry ($F=12.36$; $p=0.000$). The Tukey post-hoc revealed that time commitment was statistically higher among individuals with more than 10 years' experience ($M=129.6\text{m/d}$) in the industry compared to the 1 to 5 years ($M=78.4\text{ m/d}$) and 6 to 10 years ($M=68.7\text{ m/d}$) groups. Thus, RFPS with 10 or more years of experience in the food service industry spent the most time searching for nutrition information from cookbooks, which was nearly twice as high compared to the time used by the other categories.

Similarly, a marked variation existed between listening to the radio for nutrition information in terms of differences in industry experience ($F=4.90$; $P=0.008$). Specifically, the time committed by RFPS with more than 10 years of industry experience to radio ($M=150.0\text{m/d}$) was statistically higher than the time spent by the other categories. Comparatively, respondents with more than 10 years of service spent more time listening to radio, which was more than 2 times higher than the time used by their colleagues with 1 to 5 years of experience ($M=61.4\text{m/d}$) and 6 to 10 years of experience ($M=67.4\text{m/d}$).

In addition to the above, there was a statistically significant difference between groups as determined by the one-way ANOVA ($F=3.24$; $P=0.040$), regarding time commitment to search from the television by respondents' current position. It was specifically observed that cooks spent more time ($M=75.0m/d$) viewing television for nutrition information than their colleagues who were head chefs ($M=51.4m/d$).

The analysis of variance further revealed a significant difference between the time used in listening to the radio for nutrition information across the various categories of respondents' current position ($F=2.94$; $P=0.056$). It was observed that head chefs accounted for the variation in time spent listening to the radio ($M=134.2m/d$). The time committed by head chefs was significantly higher than the other categories (Table 22). Accordingly, sous chefs used two times less time in listening to the radio ($M=52.6m/d$) for nutrition information. Likewise, on the average, cooks committed less time ($M=66.9m/d$).

Ultimately, there were few between-group differences in time committed to searching for nutrition information from the top five sources across respondents' background characteristics. Generally, time commitment towards the sources did not show statistically significant differences regarding the use of the internet and television across respondents' background characteristics apart from current position. This suggests that irrespective of their background, most of the respondents devoted equal time to the internet and television as sources of nutrition information. The significant differences were largely observed within the groups who used cookbooks and radio.

Perceived Barriers to Nutrition Information Seeking

Barriers to information acquisition are obstacles that limit an individual's ability to access relevant nutrition information from a reliable source. The scale that was used to assess the respondents' barriers to seeking nutrition information was adapted from the HINTS, a study conducted by Ndahura (2012), Zoellner & Carr (2009), and Zoellner et al. (2009). The results are summarised in Table 23. The internal consistency reliability test ($\alpha=0.75$) of the barrier construct sufficiently achieved the standard threshold of 0.7 (Boslaugh, 2013; Pallant, 2013).

Table 23: Perceived Barriers to Seeking Nutrition Information

Barriers	D	N	A	M ^a	SD ^b	α
	30.8	50.3	18.9	1.88	0.69	0.75
It took me a lot of effort to get the information I needed	53.7	9.3	37	1.83	0.93	
I felt frustrated during my search	59.4	15.9	24.7	1.65	0.85	
It was difficult to verify the credibility of the information	49.5	17.9	32.6	1.83	0.89	
The information I found was too difficult to understand	64.6	16.1	19.3	1.54	0.79	
I was concerned about the relevance of the information in my context	42.2	15.5	42.2	2.00	0.92	
There is a lack of nutrition-related information in other languages apart from English	36.0	14.1	49.9	2.13	0.91	

Source: Field survey, Addison (2018)

Scale: 1= Disagree, 2= Neither Agree nor disagree, and 3= Agree

Note: ^amean, ^bstandard deviation, α =Cronbach's alpha

In addition, half of the respondents (49.9%) agreed that there is a lack of nutrition-related information in other languages apart from English. This is an important issue worth considering because literacy is beyond English proficiency. Rather, it is the ability to read and write in any language an individual is comfortable with. Some of the RFPS who participated in this study would have preferred that nutrition information is presented in Ghanaian dialects since Ghana comprises many ethnic groups. This result is similar to Ndahura's (2012) findings that indicated that the respondents studied agreed that diet or food information in other languages apart from English was a major barrier to seeking information about nutrition.

In addition, close to half of the respondents (42.2%) showed concerns about the relevance of the information they found to what they do as RFPS. Furthermore, a third of the respondents indicated that identifying the information involved a lot of effort and it was difficult for them to verify the credibility of the information they sought after (37% and 32.6% respectively). A quarter of the respondents (24.7%) also felt frustrated during the search. Contrary to the finding reported by Ndahura, more than half of the respondents (64.6%) in this study disagreed that the information was too difficult to understand.

Unexpectedly, a small but quite noteworthy percentage (approximately 9% to 18%) of respondents remained neutral to the barrier statements. This is of concern because it implies that they were uncertain as to whether they were faced with any barriers or not. Uncertainty, in this case, could present some level of difficulty in appreciating whether this category of RFPS faced any barriers in seeking nutrition information or not. For that matter, it would be

equally difficult to prescribe possible interventions to address those barriers for such individuals, if any existed. This neutral perception was demonstrated in some studies that reported that respondents were uncertain about barriers to nutrition information seeking (Ndahura, 2012; Zoellner & Carr, 2009; Zoellner et al., 2009).

Likewise, the overall rating for barriers to nutrition information seeking was neutral or average ($M=1.83$). Nevertheless, whatever the case might be, these individuals' neutral position must be diluted, and attention particularly paid to them just like their counterparts who agreed to the barrier statements. Once this is done, the barriers would be minimised so that majority of them would have access to nutrition information from reliable sources. The barrier with the least mean score was the information was too difficult to understand ($M=1.54$), whereas, the barriers with the highest mean score were; there is a lack of nutrition-related information in other languages apart from English ($M=2.13$) and concern about the relevance of the nutrition information to food production ($M=2.00$).

Confidence in Seeking Nutrition-related Information

The statement used to assess confidence in seeking nutrition information was adopted from the HINTS, Ndahura (2012), Zoellner and Carr (2009), and Zoellner et al. (2009). Results from this study (Table 24) suggest that only 14.7 percent of respondents were completely confident that when they need nutrition information, they could get it. However, almost half of the respondents (43.3%) were very confident, 16.3 percent were somewhat confident, 20.7 percent were a little confident and 5.0 percent were not confident at all. The mean confidence

score was (M=3.41). Hence, on the average, the RFPS were only somewhat confident that they would get nutrition information if they desired it. This finding is in accordance with other studies (Ndahura, 2012; Zoellner & Carr, 2009).

Table 24: Level of Confidence in Seeking Nutrition Information

Confidence in seeking nutrition information	Number	Percentage
Not at all confident	25	5.0
A little confident	103	20.7
Somewhat confident	81	16.3
Very confident	215	43.3
Completely confident	73	14.7
Total	497	100

Source: Field survey, Addison (2018)

Zoellner & Carr's (2009) study among school nutrition managers found overall confidence in seeking nutrition information to be somewhat confident (low to neutral). Similarly, though there are differences in the target population studied, a crude comparison between findings from this study and that of Ndahura (2012) revealed that a smaller percentage of the respondents indicated high levels of confidence in seeking nutrition information. Ndahura also reported that on the average the respondents were somewhat confident that when they needed nutrition-related advice or information, they could get it. This finding is important because this could signal nutrition educators and communicators to help build the confidence of RFPS in relation to information search.

Chapter Summary

This chapter dealt with the effort RFPS commit to their search for nutrition information. The chapter first presented the descriptive statistics on the topics relevant to the respondents and established the need for nutrition information. The need for more information could be satisfied through the top five sources, but most especially through the television, internet, and radio. This is because these three sources have the potential of communicating information effectively to RFPS. Even though doctors emerged as the third highest source for providing expert information, they were not frequently consulted for nutrition information.

Additionally, respondents commit more time to sources perceived to communicate very clear messages, considered to be reliable, very accessible and communicate expert information. Though they placed almost equal trust in all the sources, doctors and dietitians were considered highly trustworthy, yet were underutilised. Relatively females trusted the traditional/print sources more than their male counterparts. Relatively, whereas the males trusted more in the internet, the females trusted more in cookbooks.

Finally, significant variations were established in time committed to sources and trust in information sources across some socio-demographic and employment characteristics of the respondents. The next chapter explores the nutrition knowledge level of respondents.

CHAPTER SEVEN

LEVEL OF CULINARY NUTRITION KNOWLEDGE

Introduction

This chapter focusses on the third research question guiding the study, which seeks to assess the level of nutrition knowledge of RFPS. It is expected that the findings may provide answers to the question of whether RFPS are conversant with food and nutrition-related topics which directly influence the quality (nutrition) of food they serve to customers on a daily basis. Further, this chapter explored the predictors of nutrition knowledge. This may extend our appreciation of factors that shape their knowledge levels.

Nutrition Knowledge Assessment

The motivation for knowledge assessment is based on a futuristic assertion made over two decades ago by Renaghan and O'Brien (1995) that to meet contemporary challenges in the food service industry, nutrition knowledge must be updated to encompass current issues. Kwon and Ju (2014) indicated that, along with the frequency of eating out is a decline in the overall nutritional quality of the diet. This makes the nutrition expertise of RFPS very essential to the continuing effort of providing nutritious menu items in recent times.

One of the theories (Social Cognitive Theory) underpinning this study provides support for the assessment of nutrition knowledge. Further, another concept used in this study (Food Service Subsystem) which helps to detect how nutrients leach out, provides support for knowledge assessment. It was, therefore, considered as an important aspect to explore in this study to better

explain the nutrition literacy status and decision making of RFPS, in addition to identifying the stage within the food flow stages that knowledge could be compromised. This would help nutrition communicators and educators if they wanted to tailor information covering specific topics to RFPS (nutrient retention strategies) to help minimise the losses and to improve food quality.

To gain insights into their nutrition knowledge, the respondents were asked to provide answers (True or False) to ten nutrition-related items. The responses were scored and interpreted using Zoellner and Carr's (2009) categorisation – low nutrition knowledge, limited/moderate nutrition knowledge, and a possibility of having adequate nutrition knowledge. Table 25 presents the participants' responses to the ten items used to gauge nutrition knowledge about food preparation/mise en place, cooking, storage and holding.

Regarding knowledge about food preparation, 63.8 percent of the respondents recognised that soaking of foods in water dissolves water-soluble vitamins and minerals, but more than half failed to recognise that peeling vegetables before cooking (66.0%), submerging frozen chicken under water to defrost (54.7%), or washing rice before cooking (56.3%) were not good practices because such acts compromise the quality of the ingredients.

Knowledge about cooking practices was quite satisfactory. A little over half of the respondents (56.7%) recognised that batch cooking helps to retain nutrients in food than bulk cooking. Approximately 62 percent also acknowledged that heat causes nutrient loss, especially vitamin C. However, a surprising percentage of the respondents (59.4%) endorsed adding baking soda to green vegetables during cooking because it enhances the colour, which is not a healthy practice and must be checked.

Table 25: Respondents' Knowledge about Culinary Nutrition

Statement	Number and Percentage with Correct Responses	
	n	%
<i>Food preparation/mise en place</i>		
Soaking of foods in water dissolves water-soluble vitamins and minerals. (A: True)	317	63.8
The best way to thaw frozen chicken is by submerging it under water. (A: False)	225	45.3
Washing rice before cooking reduces the vitamins and minerals content. (A: True)	217	43.7
It is very necessary to peel vegetables (carrots, cucumber) before cooking. (A: False)	169	34.0
<i>Cooking practices</i>		
Heating food causes nutrient loss, especially vitamin C. (A: True)	306	61.6
It is highly recommended to add baking soda to green vegetables during cooking because it enhances the colour (A: False)	295	59.4
Bulk cooking helps retain nutrients in food than batch cooking. (A: False)	282	56.7
<i>Food storage and holding</i>		
Extended holding of high quality food has no influence on the flavour, texture, colour and shape. (A: False)	242	48.7
Fruits and vegetables must be exposed in the refrigerator during storage (A: False)	204	41.1
It is better to store evaporated milk in transparent containers to preserve riboflavin. (A: False)	98	19.7

Source: Field survey, Addison (2018)

Overall, respondents' knowledge about food storage can be described as poor. Only a fifth of respondents knew that it is not good to store evaporated milk in transparent containers because it loses the nutrition value. Again, over a third of the respondents (41.1%) were knowledgeable that fruits and vegetables must not be exposed in the refrigerator during storage. Finally, regarding knowledge of food holding, close to half of the RFPS were aware that extended holding of high-quality food has a negative influence on the flavour, texture, colour, and shape.

The raw scores were further transformed into three categories of knowledge by restaurant type. The maximum score a respondent could get is 10. The respondents were divided into three groups as RFPS with low, moderate and adequate nutrition knowledge. In order to classify the respondents into these groups, a range of score were used. Accordingly, respondents who scored up to 5 items correctly were termed as exhibiting low nutrition knowledge; those who answered 6 to 7 items correctly were termed as displaying moderate nutrition knowledge and those who answered 8 to 10 items correctly were termed as respondents with the likelihood of possessing adequate nutrition knowledge.

The results revealed that, of the 497 RFPS, 320 (64.4 %) answered 1 to 5 items correctly, thereby exhibiting low nutrition knowledge. Next, 148 (29.8%) also answered 6 to 7 items correctly, thereby displaying moderate nutrition knowledge. Finally, 29 (5.8%) answered 8 to 10 items correctly which suggested the possibility of adequate nutrition knowledge.

The level of nutrition knowledge appeared to vary between the different types of restaurants. A greater number of Hotel RFPS exhibited low to moderate nutrition knowledge as compared with the other restaurant category studied.

However, from the data it was gleaned that nutrition knowledge was rather highly exhibited by RFPS from independent restaurants (Figure 12).

Nonetheless, respondents from the two categories of restaurants generally exhibited low nutrition knowledge with over 60 percent scoring below the average mark of 6. The results, therefore, showed that there is a deficit in relation to culinary nutrition knowledge among the RFPS.

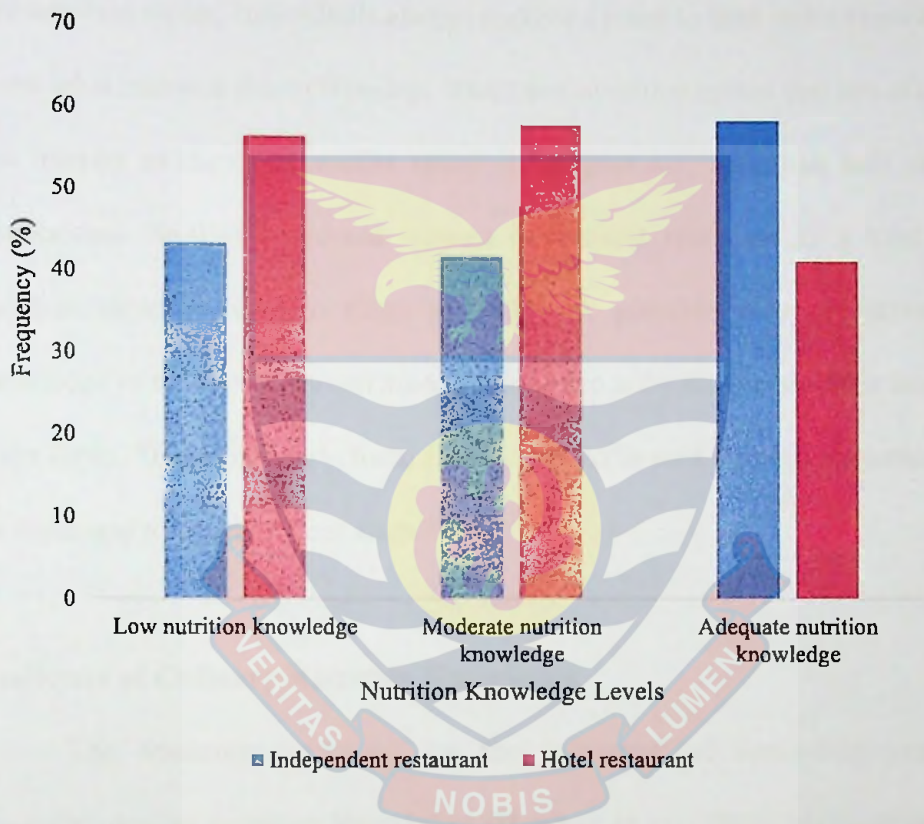


Figure 12: Respondents' Level of Nutrition Knowledge by Restaurant Type

Source: Field survey, Addison (2018)

Generally, respondents were found to have very low to moderate knowledge on nutrition. Deficiency in nutrition knowledge among RFPS may lead them to expose both the raw and cooked food to high risk conditions that will cause nutrient leaching. This will consequently affect the nutritional quality of the food. Hence nutrition knowledge needs improvement if nutritional quality

of food must be safeguarded. It is acknowledged that knowledge does not necessarily guarantee good practices. Nevertheless, knowledge also serves as a powerful drive or tool for individuals and groups who desire change (Chapman, Ham, Liesen, & Winter, 1995).

Another plausible explanation to the low nutrition knowledge exhibited by the RFPS could be linked to the level of importance attached to some food and nutrition topics. Individuals always make it a point to seek more knowledge about what interests them (Worsley, 2002) and overlook issues that are of no or less interest to them. As earlier noted in Chapter six, less than half of the respondents (46.0%) expressed interest in nutrient retention as a food and nutrition topic relevant to them as RFPS. A possible way of increasing knowledge in nutrient retention among this group is by stirring up their interest in the topic. This would help them if they wanted to seek more information on the topic and to upgrade their knowledge.

Predictors of Culinary Nutrition Knowledge

The literature is sound on the influence of socio-demographic characteristics on nutrition knowledge (Hendrie et al., 2008; McLeod et al., 2011). The relationship between some socio-demographic, employment variables, antecedents of knowledge levels, and nutrition knowledge was assessed using Hierarchical Linear Regression (Table 26). Model 1 sought to isolate the effect of socio-demographic and employment characteristics on nutrition knowledge. The second Model also tested the effect of the main variables, antecedents of nutrition knowledge (Model 2). Finally, the last model tested the two sets of independent variables on nutrition knowledge (Model 3).

Table 26: Determinants of Respondents' Nutrition Knowledge Levels

Predictors	Module 1	Module 2	Module 3
	Coef. (SE)	Coef. (SE)	Coef. (SE)
Socio-demographic characteristics			
Sex (ref. male)			
Female	-0.188 (0.229)		-0.194 (0.231)
Age	-0.015 (0.026)		-0.018 (0.026)
Marital Status (ref. Single)			
Married	-0.247 (0.271)		-0.196 (0.277)
Education (Primary/JHS)			
SHS	0.206 (0.435)		0.279 (0.452)
Vocational	0.244 (0.465)		0.214 (0.481)
Polytechnic	0.670 (0.456)		0.698 (0.470)
University	0.483 (0.547)		0.457 (0.560)
Nutrition education (ref. Educated)			
Uneducated	-0.638 (0.267)**		-0.660 (0.284)*
Employment characteristics			
Industry experience (years)	0.034 (0.038)		0.032 (0.038)

Table 26 Continued

Experience in current position (years)	0.064 (0.058)		0.058 (0.058)
In-service training(hours)	-0.086 (0.030)**		-0.093 (0.031)**
Antecedents of NK			
Confidence in seeking nutrition information		-0.109 (0.074)	-0.044 (0.100)
Trust in sources		-0.149 (0.146)	-0.186 (0.207)
Barriers to seeking nutrition information		0.036 (0.146)	0.042 (0.203)
Total time for seeking nutrition information		0.058 (0.025)*	0.080 (0.033)**
Constant	5.166 (0.829)**	5.433 (0.756)**	5.786 (1.291)**
R^2	0.10	0.01	0.14

Source: Field survey, Addison (2018)

Note: SE=Standard Error; ** P<0.010; *P<0.050

Looking at the first two models (Table 26), it can be observed that the effect of the socio-demographic and employment characteristics, as a factor, in explaining the nutrition knowledge of RFPS seems higher ($R^2=0.10$; $p<0.010$) relative to the main explanatory variables. The second model, albeit, showing a small variance, was also significant in explaining nutrition knowledge ($R^2=0.01$; $p<0.010$). Nonetheless, there was an improvement in the explanatory

power of the model when the 2 independent variables were jointly modelled ($R^2=0.14$; $p<0.010$).

Further, it can be observed from model 3 that the time committed to nutrition information search is a significant predictor of nutrition knowledge such that RFPS who spent more time searching for nutrition information tended to possess average to high nutrition knowledge. Thus, time committed to nutrition information search increased nutrition knowledge by a factor of 0.080. This is possible because the respondents demonstrated the ability to use multiple sources in seeking nutrition information (Chapter five). Knowledge is acquired from available information after assigning meaning and interpretation to the information (Miller, 2002).

However, as noted earlier in Chapter six, nutrient retention ranked fifth and was considered as a moderately important food and nutrition topic. Consequently, to improve on nutrition knowledge (nutrient retention) through information search, nutrition educators and communicators must espouse an approach that seeks to stimulate and increase the interest of the target population and to develop nutrition content to satisfy their information need. Interest is strongly associated with emotional engagement (Sun & Rueda, 2012) and has the potential to dictate the topics explored by an individual to build on knowledge. Previous studies have found strong relationships between interest and knowledge gain (Chew & Palmer, 1994).

Another study from Public Health revealed that stimulating interest successfully increased participants' attention to visit a website about Hepatitis A, B, and C virus infections and the possibility of clicking the link to actually visit the website (Crutzen, Ruiters & de Vries, 2014). Another significant

predictor of respondents' nutrition knowledge is their background in nutrition. Table 26 indicated that the predicted value of nutrition knowledge for respondents without any prior nutrition education is 0.660 lower than those with nutrition background.

Regarding the control variables, the study results present an indication that the hours committed to in-service training for nutrition requirements is a significant determinant of nutrition knowledge. However, the coefficient shows a negative correlation implying that more training time decreases nutrition knowledge by a factor of 0.093. Thus, RFPS who have received more training (i.e., hours spent) are likely to possess low nutrition knowledge. This finding is important, with implication for the mode of training adopted by the restaurant's management. If the training approach is not behaviour based and or very practical, RFPS after undergoing such training would not yield much improvement in knowledge. Anecdotal evidence suggests that most training programs in developing countries, of which Ghana is one, tend to be focussed on theory or are highly attitude based. As a result, these training modes are less likely to generate behaviour-based knowledge and or practice.

Factors considered that were not substantial in the model were sex, age, marital status, educational attainment, industry experience, experience in current position, confidence in seeking, trust in sources and barriers to seeking. Although prior nutrition education ($\beta=0.660$), in-service training on nutrition requirements ($\beta=0.093$) and total time committed to searching ($\beta=0.080$) were noted to have significant bearing on nutrition knowledge, nutrition education was the most significant predictor. This suggests that if nutrition educators

target RFPS with tailored nutrition intervention, it is likely to influence their knowledge level positively.

Chapter Summary

This chapter sought to assess the nutrition knowledge level of RFPS. This section of the study also sought to provide empirical support of antecedents of nutrition knowledge as explanatory factors of nutrition knowledge or otherwise. The results indicated that knowledge was low, with 64.4 and 29.8 percent of the respondents possessing low and moderate nutrition knowledge respectively. In the area of food preparation and cooking methods, knowledge was found to be quite satisfactory. On the other hand, knowledge about food storage and holding was poor.

Further, it was revealed that nutrition knowledge score was similar for both types of restaurants studied. However, the nutrition knowledge differed by sex and education. Relatively, whilst most females possessed low or moderate nutrition knowledge, males were found to possess more of adequate nutrition knowledge. The findings also indicated that the time committed to nutrition information search is a significant determinant of nutrition knowledge. Instead, the hours committed to in-service training for nutrition requirements significantly reduced nutrition knowledge. The next chapter addresses the nutrition literacy status of RFPS and explores the determinants of nutrition literacy.

CHAPTER EIGHT

NUTRITION LITERACY STATUS

Introduction

This chapter explores Nutrition Literacy (NL) status of RFPS. In this chapter, the structure and validity of the NL construct are explored using confirmatory factor analysis. In addition, the predictors of the variance in the NL levels are explored using multivariate and bivariate linear regressions.

Respondents' Nutrition Literacy Status

Nutrition literacy was assessed in terms of the ability to obtain basic nutrition information, as well as the capabilities to comprehend and apply nutrition information. The assessment of NL in this section was based on Ishikawa et al.'s (2008b) and Nutbeam's (2000) measurement scales for health literacy. The findings were also interpreted with understanding from Cimbaro's (2008) Model of Nutrition Literacy. Nutbeam's model has received research attention over the past 2 decades because of its potential ability to assess individuals' skills and attitudes in seeking, understanding and taking actions to manage nutrition issues at the personal, professional, national and international levels. Nonetheless, most researchers have limited their exploration of the 3-dimensional construct to Exploratory Factor Analysis (Blegen, 2011; Ndahura, 2012; Pettersen et al., 2009).

The model identifies three levels of literacy: Functional Nutrition Literacy (FNL), Interactive Nutrition Literacy (INL) and Critical Nutrition Literacy (CNL). In this study, FNL measured an individual's ability to extract

and comprehend nutrition information, and the difficulties they are likely to encounter; INL measured an individual's interpersonal skills needed to extract and understand nutrition information from different sources, as well as to discuss and manage nutrition issues in collaboration with others; CNL measured an individual's ability to analyse nutrition information critically and willingness to take action to address barriers to improve nutritional aspects.

The items adapted to measure the three dimensions of the NL construct have been described in Appendix D. FNL latent construct consisted of ten observable items, INL latent construct consisted of nine observable items, and the CNL latent construct had eleven observable items. A total of thirty variables were adapted to measure the three latent constructs. Items one to eight under the FNL construct and item nineteen under the INL construct were reversed scored before the analyses because they were negatively worded for easy solicitation of data. The reverse scoring of these items was necessary because the interpretation associated with the numerical values or scores had to run in the same direction from one to five, and the items positively reworded for ease of comprehension. So, in this case, strongly agree attracted a score of 5, disagree became 4, neutral remained 3, agree became 2 and strongly agree attracted a score of 1.

Structure of Nutrition Literacy

The structure and parsimony of the construct were assessed using Confirmatory Factor Analysis. Generally, CFA is indispensable for obtaining valid results, as it is advantageous in ascertaining how well the adapted scale fits the dataset. With a sample size of 497, it was possible to estimate the

relationship between the latent constructs and the observed variables in the nutrition literacy scale. In essence, the CFA allowed for the validation of the scale that was adapted to measure the nutrition literacy status of RFPS.

The data was first screened to observe any extreme violation of SEM assumptions, particularly multivariate normality (Chen, Bao & Huang, 2014). It was observed that the data did not digress from the normal distribution (Kline, 2015) and had high string validity. To proceed with the CFA, the normality of the scale scores was initially gauged by examining the data for skewness and kurtosis, whilst examining the histograms and P-P plots. This inspection revealed a normally distributed scale score.

Additionally, the inherent normality test in the AMOS software showed that the data presented both univariate and multivariate normality that satisfied the condition for CFA. The kurtosis value was within the acceptable threshold with values (-1.27 to 1.99) less than the cut-off point of 7.0 (West, Finch & Curran, 1995). Consequently, all the observed variables were retained for the CFA, based on the normality analysis and subsequently the CFA conducted on the data (Appendix E).

Given the fact that the NL scale was measuring a hierarchical reflective model, the items were seen as a mere reflection of their latent construct. Thus, the items were deemed interchangeable particularly under the FNL construct and so removing one item was presumed not to have any effect on the others. An examination of the Modification Indices (MI) indicated eight variables loaded less than the threshold of 0.5. These observed variables (statements 5, 9, 10, 17, 19, 29 and 30) were, therefore, removed and the CFA model was re-specified.

The re-specified model was seen to have improved in terms of results and did not demonstrate any indication of cross loading. Markers of convergent validity of the constructs were also within widely permissible threshold 0.05, which further suggest optimal internal consistency (Byrne, 2016). The remaining 22 observed items loaded significantly between 0.51 and 0.83. None of the standardized estimates was below 0.50 or greater than one, which confirmed the uni-dimensionality across all the three constructs. The Cronbach's alpha and composite reliability scores were all beyond the thresholds of 0.7 (Bagozzi & Yi, 2012).

Table 27 offers the description of the scores of the observed variables and constructs as well as their reliability measures. The Cronbach's alpha values reported from the reliability test were well above the acceptable threshold of 0.7 (Pallant, 2013). The results suggest that each construct has high string reliability with corresponding values ranging from 0.82 to 0.86.

Table 27 indicates that, on the average, RFPS had moderate scores for FNL (M=3.07) yet high scores for INL (M=3.64) and CNL (M=3.77). In relative terms, the scores on each observed variable in the nutrition literacy scale was generally lower for FNL variables than for INL and CNL items. Put differently, RFPS possess average basic skills required to extract and comprehend nutrition information but possess high cognitive ability and interpersonal skills needed to manage nutrition issues in collaboration with their colleagues and supervisors. In addition, they also have high cognitive skills required to analyse nutrition information critically, increase awareness and participate in action to address barriers.

Table 27: Description of the Nutrition Literacy Constructs

Construct	Items	M ^a	SD ^b	α
CNL		3.77	0.77	0.86
	Often check if nutrition information is valid and reliable	3.55	1.10	
	Important for food service outlets to provide a variety of nutritious foods	3.89	1.10	
	I expect my restaurant to serve nutritious food to customers	4.16	0.97	
	Willingness to take an active role in promoting healthy menu	4.03	1.05	
	Influence colleagues to apply nutrition information when cooking	3.85	1.11	
	I tend to be influenced by the nutrition advice I read from books, newspapers, magazines, etc	3.50	1.10	
	I tend to be influenced by the nutrition advice I get from my colleagues	3.53	1.04	
	I tend to be influenced by the nutrition advice I get from my supervisor	3.63	1.06	
FNL		3.07	0.83	0.82
	When I read about nutrition, I do not find words that I do not know	2.84	1.28	
	I do not need a long time to read and understand the content	3.03	1.23	
	I do not need someone to help me understand the content	3.33	1.16	
	I do not find information on nutrient retention too difficult to understand	3.30	1.12	
	I do not find nutrition language used by experts difficult to understand	3.23	1.21	
	I do not find symbols and jargons that I am not familiar with	2.78	1.20	
	I do not find information from scientific journal too difficult to understand	2.97	1.19	
INL		3.64	0.76	0.81
	I have gathered relevant nutrition information from various sources	3.50	1.14	
	I discuss my thoughts about nutrition with my colleagues	3.68	1.06	
	I have changed my cooking methods based on nutrition information gathered	3.83	0.97	

I use the internet when searching for nutrition information	3.57	1.13
I follow cook shows, for example on television	3.86	1.02
I often read printed materials about food and nutrition	3.58	1.20
I readily take the initiative to discuss nutrition with my supervisor	3.44	1.12

Source: Field survey, Addison (2018)

Note: ^a=Mean, ^b=Standard Deviation

This finding is not consistent with the theoretical supposition advanced by the originator of the Nutrition Literacy theory (Nutbeam, 2000), that individuals require sufficient skills in functional literacy to effectually move to the next levels -interactive and critical literacy. This finding is at variance with previous research within the context of Health Literacy. Since Ishikawa et al.'s (2008b) study was based on Nutbeam's hierarchical model, a reasonable comparison could be made albeit the contextual differences. Ishikawa et al.'s (2008b) study revealed a higher score for the functional HL items compared with communicative and critical HL items, which according to the authors were consistent with the theoretical supposition that communicative and critical HL involve more advanced skills.

Nonetheless, this finding does not digress from the context, given the structures and procedures observed in most restaurant kitchens. Regarding the kitchen setup where protocols are upheld, and the fact that cooks dominated this study, this finding is not startling. RFPS work as a team complimenting the effort of each other. In addition, cooks work in close contact with and constantly take instructions from their superiors, thereby encouraging communication between them and their colleagues as well as their supervisors. Communication

is key to the successful execution of their daily tasks (intended to satisfy both guests and management).

Further, as mentioned earlier in the preceding chapters, colleagues and supervisors were considered trustworthy by the RFPS. They also ranked colleagues 4th and 5th with respect to accessibility and clarity of information respectively in information seeking. These delineations above may have accounted for the high scores, particularly, on the INL items.

Furthermore, as regards the INL construct, apart from one item (I readily take the initiative to discuss nutrition-related issues with my supervisor), the RFPS agreed to all the attitude statements. INL was gauged with attitude statements describing respondents' interpersonal skills needed to extract nutrition information from different sources, discuss and manage nutrition issues in collaboration with others. They particularly agreed that they discuss their thoughts about nutrition with their colleagues (M=3.68). Additionally, they agreed to the use of the internet when searching for nutrition information (M=3.57), following cook shows, especially on television (M=3.86) and changing their cooking methods based on nutrition information gathered from various sources (M=3.83).

The findings reinforce the conceptual underpinning of the study, which states that INL promotes two-way communication (Cimbaro, 2008), allowing the RFPS to adapt nutrition-related information and activities to the tasks they perform in the kitchen. The RFPS demonstrated the ability to gather relevant nutrition information from various sources. They also possess the interpersonal skills to discuss nutrition-related issues with their colleagues and supervisors. However, they do not readily take the initiative to discuss with their supervisors.

This possibly means that they wait for their supervisors to initiate the nutrition conversation through the assignment of duties.

Further, based on the knowledge they have gained from reading printed materials, watching cook shows on television, searching the internet, and through discussions with their colleagues, the RFPS have changed their cooking methods. This suggests that they have the ability to derive meaning from the nutrition messages they get from different sources and apply the knowledge acquired to their changing circumstances.

FNL was measured with statements describing respondents' difficulty or ease in seeking and comprehending nutrition information. Items used to gauge the FNL construct include the following: when I read about nutrition, I do not find words that I do not know; I do not need a long time to read and understand the content; I do not need someone to help me understand the content; I do not find information on nutrient retention too difficult to understand; I do not find nutrition language used by experts difficult to understand; I do not find symbols and jargons that I am not familiar with; and I do not find information from scientific journal too difficult to understand.

Overall, the RFPS had average scores for all the attitude statement measuring the construct (Table 27). There were, however, some variations noted across the specific items upon which FNL was evaluated. For instance, as evident in Appendix D, the majority of the RFPS demonstrated satisfactory reading skills by agreeing that they neither need a long time to read nutrition messages (45.3%) nor need help from someone to be able to read and understand nutrition messages (53.5%). However, they had challenges deciphering some nutrition words (51.7%) or symbols and jargons (50.7%).

This suggests that the RFPS exercise some level of difficulty in seeking and comprehending nutrition information as a result of the language peculiar to the subject area. The difficulty does not lie in their deficiency in basic literacy (ability to read or write) to follow simple nutrition messages. However, since nutrition is a specialised area, they need to be nutrition literate, thereby, possessing an appreciable level of skills to extract and comprehend either simple or complex nutrition words, symbols or jargons. This finding reinforces the assertion that functional literacy is situation-specific: someone's reading skills may be adequate in one setting and marginal or inadequate in another (Parker et al., 1995). Nonetheless, it seems this difficulty was buffered by their constant interaction with colleagues and supervisors. Hence, they can acquire and enhance their nutrition knowledge. This finding is similar to some findings made in the Health Literacy literature (Blegen, 2011; Ndahura, 2012). These results should, however, be taken with caution because the studies were conducted among students in Norway and Uganda respectively.

CNL was measured from attitude statements describing respondents' ability to analyse nutrition information critically, increase awareness and willingness to take action to improve nutritional aspects at the professional, and national levels. The results as evident in Table 27 divulged that the RFPS agreed to all the attitude statements. For instance, they agreed that they often check if nutrition information is valid and reliable ($M=3.55$). They also expect their restaurants to serve nutritious foods to customers ($M=4.16$) and they are willing to take an active role in promoting healthy menu options ($M=4.03$). Again, they agreed that they influence their colleagues to apply nutrition information when

cooking ($M=3.85$); likewise, they tended to be influenced by the nutrition advice they received from their colleagues ($M=3.53$).

The finding that the RFPS expect their restaurants to serve nutritious foods to customers is very important because they are an indispensable part in achieving that expectation. They are directly involved in the food production and with such an attitude, it makes it much easier to take an active role in promoting healthy menu options served by their respective restaurants.

Secondly, with such a positive attitude, they are more likely to be in the position to increase nutrition awareness and influence their colleagues to practice good nutrition. This assertion was evidenced by their willingness to influence their colleagues to apply nutrition information when cooking. Similarly, they also tended to be influenced by the nutrition advice they received from their colleagues. This finding brings into complete respite the acceptance of the nutrition responsibility they have towards their customers.

Further, the findings suggest that the RFPS possess the skills to critically analyse nutrition-related information by habitually checking the validity and reliability of the nutrition information they are exposed to. Categorically, the findings support the conceptual framework underpinning this section of the study proposed by Cimbaro (2008). According to Cimbaro (2008), communication at the CNL level is transactional, allowing the RFPS to constantly analyse nutrition-related information while exchanging feedback (face to face) to ensure understanding. Subsequently, it enables them to participate in activities to promote nutrition at the professional level.

The model fitness was further evaluated using robust model fitting statistics such as the comparative fit index (CFI), incremental fit index (IFI),

and the root mean square error of approximation (RMSEA), Tucker-Lewis Index (TLI) and goodness-of-fit index (GFI). The model fit indices (CFI=0.932; TLI=0.916; IFI=0.933; RMSEA=0.057; GFI=0.919) indicate a tolerable fitting for the data. The convergent validity was evaluated by checking the values of average variance extracted. The CFA results are presented in Table 28.

Table 28: Assessment of the Dimensions (CFA)

Construct	Items	SRW	AVE	CR			
CNL	Often check if nutrition information is valid and reliable	0.53	0.43	0.85			
	Important for food service outlets to provide a variety of nutritious foods	0.60					
	I expect my restaurant to serve nutritious food to customers	0.76					
	Willingness to take an active role in promoting healthy menu	0.77					
	Influence colleagues to apply nutrition information when cooking	0.83					
	I am influenced by the nutrition advice I read from books, newspapers, magazines, etc	0.55					
	I am influenced by the nutrition advice I get from my colleagues	0.57					
	I am influenced by the nutrition advice I get from my supervisor	0.56					
	FNL	When I read about nutrition, I do not find words that I do not know			0.66	0.37	0.81
		I do not need a long time to read and understand the content			0.62		
I do not need someone to help me understand the content		0.61					
I do not find information on nutrient retention too difficult to understand		0.58					
I do not find nutrition language used by experts difficult to understand		0.63					
I do not find symbols and jargons that I am not familiar with		0.62					
I do not find information from scientific journal too difficult to understand		0.56					
INL	I have gathered relevant nutrition information from various sources	0.51	0.39	0.81			
	I discuss my thoughts about nutrition with my colleagues	0.71					

Table 28 Continued

Changed cooking methods based on nutrition information gathered	0.72
Use the internet when searching for nutrition information	0.58
I follow cook shows, for example, on television	0.59
I often read printed materials about food and nutrition	0.58
I readily take the initiative to discuss nutrition with my supervisor	0.63

Source: Field survey, Addison (2018)

$\chi^2 = 488.045$; $df=186$; $p=0.000$; $CFI=0.932$; $TLI=0.916$; $IFI=0.933$; $RMSEA=0.057$; $GFI=0.919$; $PCLOSE=0.032$

Note: SE: standardized regression weights; CR: composite reliability; AVE: average variance extracted

The estimated AVE's for the constructs were below the basic threshold of 0.50 but could be considered as marginally acceptable (Chen et al., 2014). AVE is a more conservative measure and researchers who fail to successfully achieve the threshold may conclude the convergent validity of the construct is adequate on the basis of the composite reliability alone (Fornell & Larcker, 1981). Hence, though the AVE's for the constructs were below 0.50, the construct is still regarded as bearing sufficient convergent validity as the composite reliability (0.85, 0.81 and 0.81 respectively) of the factors were above 0.80 (Chen et al., 2014).

To attain discriminant validity, none of the constructs' correlation estimate should exceed the square root of the AVE (Fornell & Larcker, 1981). However, in this case, using the Pearson correlation estimates, the corresponding correlation coefficients between INL and CNL (0.765**) was a little higher than the square root of the AVE (0.62) of the construct (Table 29).

Nonetheless, the discriminant validity of the scale is still marginally acceptable though not perfectly satisfactory (Chen et al., 2014).

Table 29: Inter-Construct Correlations and the Square root of the AVE

Observed variables	1	2	3
1. Critical Nutrition literacy	0.66		
2. Functional Nutrition literacy	-0.225**	0.61	
3. Interactive Nutrition Literacy	0.765**	-0.134**	0.62
Mean	3.76	3.07	3.63
Standard deviation	0.771	0.835	0.758

Source: Field survey, Addison (2018)

**Significant $p < 0.01$ level (2-tailed)

Note: Diagonals represent square roots of AVE

As indicated by Table 29, except for INL and CNL, the correlation between FNL and CNL, and between INL and FNL were not strong enough. This implies, without a doubt, that correlation does not necessarily denote causation (Ndahura, 2012). Hence, the correlation between the constructs and the associations should be taken with caution.

FNL was negatively correlated with CNL, which possibly suggests that the more an individual is capable of understanding and comprehending nutrition information on their own, the less likely they will be eager to take action to improve upon the nutritional aspects of their responsibilities at the professional and national levels.

Similarly, INL was negatively correlated with FNL, which conceivably implies that high INL skills decrease FNL skills. Thus, individuals with good

interpersonal skills who needed to discuss and manage nutrition issues in collaboration with others are less likely to possess high ability to understand and comprehend nutrition information on their own.

Finally, INL positively correlated with CNL, which implies that individuals could be eager to take action to improve upon the nutritional aspects of their tasks at the professional and national levels if they probably possess good interpersonal skills needed to discuss and manage nutrition issues in collaboration with others.

Predictors of Variance in the Nutrition Literacy Constructs

Several linear regression models were estimated to assess the predictors of variance in the NL constructs using a number of variables. Trust in sources, barriers to seeking and confidence in seeking nutrition information were used as the predictor variables while FNL, INL and CNL were used as the outcome variables. Sex and education were used as control variables to isolate the actual effect of the predictor variables on the outcome variables.

To assess the influence of the variables on the NL dimensions, it was deemed appropriate to first remove cases with a mean value of three (representing neutral) to be able to isolate the cases with a true inclination towards disagreement or agreement with their corresponding moving averages (Appendix F). Adjusting for two major socio-demographic variables (sex and education); the multiple linear regression revealed that the entire predictor variables made statistically significant contributions to NL, with INL contributing the highest percentage (31%) of variance explained in the NL construct (Table 30). The predictor variables accounted for 31 percent ($R^2=0.31$;

$p < 0.010$) of the variance in INL, while accounting for 28 percent and 22 percent ($R^2 = 0.28$; $p < 0.010$; $R^2 = 0.22$; $p < 0.010$) of the variance in CNL and FNL respectively.

Table 30: Determinants of Nutrition Literacy Levels

Predictors	FNL Coef. (SE)	INL Coef. (SE)	CNL Coef. (SE)
Confidence in seeking	-0.067 (0.030)*	0.313 (0.026)**	0.308 (0.027)**
Trust in sources	0.272 (0.060)**	-0.057 (0.051)	0.007 (0.054)
Barriers to seeking	-0.513 (0.060)**	0.209 (0.051)**	0.247 (0.054)**
Sex (ref. male)			
Female	-0.000 (0.069)	-0.080 (0.059)	-0.041 (0.063)
Education (ref. Primary/JHS)			
SHS	0.179 (0.127)	0.172 (0.110)	0.200 (0.116)
Vocational	0.226 (0.136)	0.153 (0.117)	0.213 (0.124)
Polytechnic	0.468 (0.131)	0.381 (0.113)**	0.286 (0.119)**
University	0.393 (0.162)	0.176 (0.140)	0.222 (0.147)
Constant	2.814 (0.315)**	2.301 (0.272)**	2.047 (0.287)**
R^2	0.22	0.31	0.28

Source: Field survey, Addison (2018)

Note: SE=Standard Error; ** $p < 0.010$; * $p < 0.050$

Specifically, confidence in seeking nutrition information had a significant bearing on FNL, INL and CNL. It was observed that RFPS with confidence in seeking nutrition information were less likely to possess FNL skills but more likely to possess INL and CNL skills. Thus, a change in the level of confidence in seeking nutrition information decreased FNL by a factor of

0.067 but increased INL and CNL by factors of 0.313 and 0.308 correspondingly.

The level of trust in information sources is another variable that significantly influenced NL. Although trust in sources did not significantly contribute to the variance in INL and CNL, it was observed that it made a significant contribution to the explained variance in the FNL construct. Thus, a change in respondents trust in the information sources significantly increased their FNL skill by 0.277 (Table 30).

Another variable that significantly influenced all the three dimensions of NL is barriers to seeking nutrition information. Specifically, barriers to seeking had a substantial bearing on FNL, INL and CNL. It was observed that the barrier to seeking nutrition information decreased FNL by a factor of 0.513 but increased INL and CNL by factors of 0.209 and 0.247 congruently.

Furthermore, adjusting for the main predictor variables it was observed that, generally, sex and education did not play any significant role in shaping the NL of the RFPS except in the INL dimension. With this, it was observed that those with Polytechnic education compared with their counterparts without any formal education were 0.608 likely to exhibit more INL skills (Table 30). Since the Polytechnic education equips students with more soft skills and exposes them to the industry, it is not surprising that such an educational level has contributed to the INL. Chances are that they picked up the INL skills from their engagement in industrial internships during their period of training in school.

The ensuing section presents the findings on the bivariate analysis conducted to highlight the influence of the predictor variables on the NL

constructs. It is worth noting, that in the bivariate regression model also confidence in seeking nutrition information did not significantly influence FNL but had significant bearings on INL and CNL (Table 31). Thus, confidence contributes to 26 percent and 24 percent ($R^2=0.26$; $p<0.010$; $R^2=0.24$; $p<0.010$) of the variance in the INL and CNL constructs respectively.

Table 31: Confidence in Seeking Nutrition Information by Nutrition Literacy Dimensions

Item	FNL	INL	CNL
	Coef. (SE)	Coef. (SE)	Coef. (SE)
Confidence in Seeking	-0.054 (0.033)	0.343 (0.026)**	0.333 (0.026)**
Constant	3.256 (0.120)**	2.461 (0.093)**	2.625 (0.096)**
R^2	0.005	0.26	0.24

Source: Field survey, Addison (2018)

Note: SE=Standard Error; ** $p<0.010$; * $p<0.050$

The finding that confidence correlated negatively with FNL can be attributed to the thought that individuals with some level of difficulty in extracting and understanding nutrition information on their own generally reflect low confidence. The observed relationship between confidence and FNL could be rationally construed within the setting of previous research on HL. Although Zoellner et al.'s (2009) study did not assess NL based on Nutbeam's (2000) theory, the results indicated that individuals with low literacy reflect low confidence in searching for nutrition information on their own.

Accordingly, if they are limited in their functional ability, they are more likely to turn to others for help. The findings presented earlier in this chapter suggest that the RFPS sampled had moderate scores on the FNL construct. This provides opportunities for policymakers, nutrition communicators and educators to help RFPS to boost their confidence level. They can intervene by helping them develop more FNL skill, especially to extract nutrition information. The possible areas for intervention could be helping them to become very familiar with nutrition terminologies, jargons and symbols, to ease their understanding when they encounter nutrition messages.

The finding that confidence impact INL positively could be attributed to two plausible reasons. Firstly, RFPS with confidence are more likely to possess the cognitive skills required to extract nutrition information from many sources. Though on the average the RFPS were somewhat confident in themselves in seeking nutrition information, slightly over half of them were very and completely confident (combined). Secondly, they are more likely to possess the interpersonal skills needed to discuss nutrition-related issues with their colleagues and cooperate to influence nutrition practices within their environment.

Consequently, these enable them to also work independently with little or no supervision from others because they possess the ability to apply nutrition knowledge to their routine tasks. This probably explains why they do not readily take the initiative to discuss issues with their supervisors. The findings reinforce Nutbeam's (2000) assertion that people at INL level reflect improved motivation and confidence.

Further, the fact that confidence contributed to the variance in CNL could mean that through constant interaction with a colleague, they become more aware of nutrition issues and develop an interest in taking actions to address or reduce barriers. They become more answerable and try to make informed decisions that benefits the health of their customers. This reaffirms the earlier findings that the RFPS expect their restaurants to serve nutritious foods to customers and are, therefore, willing to take an active role in promoting healthy menu options.

They are also willing to influence their colleagues to apply nutrition information when cooking. Extrapolating from the theorisation of Cimbaro (2008), confidence in seeking nutrition information increases CNL and empowers the RFPS to recognise that their professional responsibilities influence the health of their customers. This finding also reinforces one key element of SCT, which is the capability of humans. Individuals have the capacity to internally develop meanings associated with external influences, plan action and anticipate its consequences, and judge their own capability to accomplish tasks.

Closely connected with confidence is the issue of trust in information sources (Ha & Jung Lee, 2011; Zoellner et al., 2009). Specifically, inferring from the bivariate analyses, it was revealed that there were some significant variations observed with respect to specific sources among the three dimensions of NL (Table 32). For instance, trust in the internet, nutrition textbooks, radio, or television was noted to significantly influence FNL. More specifically, it was observed that trust in the internet increased FNL by a factor of 0.310. Similarly,

as expected RFPS' trust in nutrition textbooks increased FNL skills by a factor of 0.288.

Table 32: Trust in Sources by Nutrition Literacy Dimensions

Trust in Sources	FNL	INL	CNL
	Coef. (SE)	Coef. (SE)	Coef. (SE)
Trust in Television	0.148(0.067)*	-0.059(0.054)	0.032(0.056)
Trust in Radio	0.176(0.075)*	-0.027(0.068)	0.012(0.066)
Trust in internet	0.310(0.064)**	-0.073(0.064)	-0.081(0.064)
Trust in Colleagues	0.012(0.080)	-0.025(0.071)	0.044(0.058)
Trust in Supervisor	0.109(0.091)	0.143(0.098)	0.199(0.096)*
Trust in Friends and Family	-0.059(0.090)	0.045(0.073)	0.100(0.063)
Trust in Doctor	0.154(0.189)	-0.364(0.135)**	-0.144(0.145)
Trust in Dietitian	0.127(0.161)	-0.030(0.150)	-0.118(0.176)
Trust in Nutrition textbooks	0.288(0.091)**	-0.050(0.075)	0.047(0.073)
Trust in Cookbooks	0.074(0.091)	-0.047(0.073)	0.071(0.065)
Trust in Newspapers	0.035(0.145)	-0.240(0.096)*	0.081(0.068)
Trust in Magazines	-0.131(0.123)	-0.086(0.110)	0.050(0.113)

Source: Field survey, Addison (2018)

Note: SE=Standard Error; ** P<0.010; *P<0.050.

Under normal circumstances, individuals need to possess basic literacy skills to extract information via the television, radio, the internet and nutrition textbooks unassisted. Hence, basic literacy skills and the clarity of some

nutrition information may have major positive influences on the nutrition literacy of individuals. The positive influence of trust in the internet and nutrition textbook on FNL possibly signifies that RFPS are increasingly searching and acquiring nutrition information and knowledge for themselves.

With respect to the INL dimension, it was observed that trust in medical doctors and newspapers inversely impact the INL. For instance, it was noted that respondents who trusted medical doctors were less likely to possess more INL skills. With respect to medical doctors, it has already been clearly stated in this thesis that they do not have a major influence on culinary nutrition in Ghana. Medical doctors are known to be traditional 'gatekeepers' of general health and nutrition information for personal health and not professional culinary practice. Hence, this finding is expected because they cannot apply the information which they receive from medical doctors to their routine tasks in commercial food production.

Similarly, respondents who had trust in newspapers significantly positively influenced INL skills by a factor of 0.240. The newspaper is regarded as information-focussed media and geared towards selling more papers using sensational headlines (Fernández-Celemin & Jung, 2006; Ha & Jung Lee, 2011). As a result, most often than not, they are inclined towards presenting reports or information that is seriously flawed (Fernández-Celemin & Jung, 2006).

Individuals at the INL level are expected to evaluate nutrition messages to be able to interact with others. An individual, therefore, requires advanced cognitive skills to critically assess the claims made by such media outlets (Ndahura, 2012). Thus, this finding implies that respondents who trust

newspapers do not have the ability to evaluate newspaper claims. In other words, they trust unreliable sources such as newspapers for nutrition information. In the long term, this can result in serious consequences if these claims are put into practice by the food production staff.

Additionally, the results in Table 32 show that trust in supervisors significantly influenced CNL by a factor of 0.199. RFPS who trusted their supervisors as a source of nutrition information were more likely to possess CNL skills. This probably suggests that supervisors can influence their associates' cognitive skills needed to analyse nutrition information critically. The supervisors can also influence them by increasing their awareness and cooperating with them to take nutrition actions. This finding is expected because the RFPS disclosed that they were influenced by the nutrition advice they received from their supervisors.

In the kitchen context, supervisors are very instrumental in shaping and reinforcing the work ethics of their associates. Some associates even model the behaviour of their supervisors. This finding is very important because this teaching agent has the power to compete with other sources such as nutrition textbooks or the internet in affecting the behaviours of others. This evidence provides support for the SCT, which stresses the significance of observational learning, imitations and modelling.

Given the difficulties some of the production staff face in accessing and extracting nutrition information especially in print formats, it is reassuring that supervisors and colleagues are not far behind in perceived trust and utilisation. Colleagues and supervisors should acknowledge this important role they play in influencing others on the job and maintain that role effectually. Subsequently,

the credibility of supervisors as disseminators of nutrition information may be sustained as they continue to act in the interest of their associates and customers.

Table 33: Barriers to Seeking Nutrition Information by Nutrition Literacy Dimensions

Barriers to Seeking	FNL Coeff (SE)	INL Coeff (SE)	CNL Coeff (SE)
It took me a lot of effort to get the information I needed	-0.108 (0.044)**	0.071 (0.041)	0.084 (0.041)*
I felt frustrated during my search	-0.030 (0.050)	-0.028 (0.046)	-0.020 (0.046)
It was difficult to verify the credibility of the information	-0.132 (0.047)**	-0.045 (0.043)	-0.020 (0.044)
The information I found was too difficult to understand	-0.115 (0.049)*	-0.108 (0.046)**	-0.071 (0.046)
I was concerned about the relevance of the information in my context	-0.119 (0.043)**	0.133 (0.040)**	0.114 (0.040)**
There is a lack of nutrition-related information in other languages apart from English	-0.036 (0.040)	0.218 (0.037)**	0.219 (0.037)**
Constant	4.055 (0.116)**	3.067 (0.107)**	3.096 (0.108)**
R^2	0.16	0.12	0.12

Source: Field survey, Addison (2018)

Note: SE=Standard Error; ** $p < 0.010$; * $p < 0.050$

Table 33 shows the bivariate analyses of the influence of barriers to seeking nutrition information on NL dimensions. Overall, significant variances were observed for the three NL dimensions, but some variations were noted, given specific barrier statements. Together the barriers explained 16 percent

($R^2=0.16$; $P<0.010$) of the variations in the FNL construct. However, four of the barriers were significant predictors of FNL.

Specifically, FNL increased 0.114 for each effort expended by RFPS in their search for nutrition information. Similarly, FNL positively correlated with the difficulty in verifying the credibility of the information by a factor of 0.139. Another barrier that significantly contributed to the FNL is difficulty in understanding nutrition information sought from any source. As evident in Table 33, as the difficulty in understanding nutrition information acquired increased, the FNL skills of the RFPS also increased by 0.124.

Furthermore, a significant regression equation was estimated to predict the influence of the barriers to nutrition information acquisition on NL which together accounted for 12 percent ($R^2=0.12$; $p<0.010$) of the variations in the INL construct. Again, four barriers were significant predictors of the INL construct. Specifically, the lack of nutrition-related information in other languages apart from English accounted for the highest significant variation (0.218) in INL. Additionally, concern about the applicability of the nutrition information to food production made a significant contribution to INL. This barrier item increased INL by a factor 0.148. Similar to FNL, difficulty in understanding nutrition information was observed to have an inverse relationship with INL (0.108). Moreover, INL skills increased by a factor of 0.071 for every unit change in the effort expended by the RFPS in identifying nutrition information from any source.

The result in Table 33 further revealed that the barriers together accounted for 12 percent ($R^2=0.12$; $p<0.010$) of the variations in the CNL dimension. Three barriers were found to be significant predictors of the CNL.

Similar to the INL, the lack of nutrition-related information in other languages apart from English accounted for the highest significant variation (0.219) in CNL. Another barrier that contributed significantly to the variation in CNL was the concern about the relevance of the nutrition information to food production. This barrier item increased CNL by a factor of 0.114. Additionally, CNL increased 0.084 for every effort expended by the RFPS during their nutrition information search.

These limitations of nutrition information sources are likely to impact individuals differently depending on their literacy levels. Consequently, these limitations if not efficiently managed influence how individuals seek and extract nutrition information (Zoellner et al., 2009). The barriers could even cause some individuals to simply ignore the information or give up on the search (Boehl, 2007; Rothman et al., 2006). Evidence from the RFPS suggests that those who felt that identifying the information takes a lot of effort reflected less FNL.

This can easily be inferred given the definition of FNL. On the other hand, INL and CNL scores positively correlated with that barrier statement, suggesting that advanced cognitive skills may be needed to overcome this problem. In addition, FNL significantly negatively correlated with difficulty in verifying the credibility of nutrition information. This is expected because, at FNL level, individuals do not need advanced cognitive skills to critically evaluate nutrition information.

Moreover, all the three NL dimensions were positively associated with the concern about the applicability of the nutrition information in the context of commercial food production. This finding suggests that irrespective of the level

of literacy, RFPS need access to relevant information that can be applied in their context.

Conclusively, the findings revealed in this section is in line with the theorisation underscoring the SCT, which suggests a bi-directional relationship among all individual behaviour, cognition and other personal factors, as well as the environmental controls operating as interacting determinants.

Chapter Summary

This chapter sought to explore the nutrition literacy levels of RFPS as well as to validate the NL scale proposed by Nutbeam (2000) and Ishikawa et al. (2008b). The results of the CFA test evidenced the reliability and validity of the NLS in RFPS. Nutbeam's (2000) health literacy model is a useful framework for exploring nutrition literacy status of food providers. It is a hierarchical model that allows for the assessment of vertical relationships among the three levels of literacy (Cimbaro, 2008). However, the findings suggest that not everyone proceed in a hierarchical manner, as suggested by the model, in attaining the optimal nutrition literacy status (CNL).

Given the study group and context under investigation, it is possible to have average functional literacy yet possess advanced skills needed to discuss and manage nutritional issues in collaboration with others and be willing to act to improve nutritional aspects at the professional and national levels. Finally, findings from the regression models highlight Ishikawa et al.'s (2008b) assertion that skills in extracting, interacting and applying information could be more essential in managing nutrition issues than the fundamental skills required to read the information. To a large extent, an individual's nutrition literacy skills

are shaped by factors such as confidence, trust and barriers to seeking nutrition information.



CHAPTER NINE

CONFIDENCE IN MAKING CULINARY NUTRITION DECISION

Introduction

This chapter discusses the results related to respondents' confidence in making nutrition decision. The chapter is divided into two main sections. The chapter started with the descriptive statistics on the confidence scale. Finally, a model explaining the predictors of confidence in culinary nutrition decision making was estimated using multiple linear regression.

Confidence Level in Making Culinary Nutrition Decision

The concept of culinary nutrition decision-making assesses the outcomes of nutrition literacy in relation to culinary skills. Largely, it is at this point that the individual applies the learning from nutrition literacy events to everyday culinary practices to accomplish nutrition goals (Cimbaro, 2008). As earlier stated in this thesis, RFPS are faced with nutrition issues daily and they are required to take on-the-go decisions whilst making recourse to the knowledge they have acquired using their fundamental literacy skills. Inspired by Zoellner & Carr's (2009) study, this section assesses the respondents' confidence or self-efficacy in culinary nutrition decision-making. The results from the descriptive statistics of the confidence items have been summarised in Table 34.

Nine items were used to gauge respondents' confidence in taking nutrition-related decisions when handling their culinary tasks. Overall, respondents expressed somewhat confidence ($M=3.47$) in making culinary

decisions. However, they expressed being very confident in taking culinary nutrition decisions relating to these three items: storing of fresh ingredients to maintain its quality before use (M=3.69), time management when cooking (M=3.65), and food preparation or mise en place (M=3.56).

Table 34: Respondents' Confidence in Culinary Nutrition Decisions

Confidence statement	M ^a	SD ^b	α
Overall	3.47		0.88
How confident are you in dealing with food prepping/ mise en place?	3.56	1.09	
How confident are you in storing fresh ingredients to maintain its quality before use?	3.69	1.04	
How confident are you in dealing with the time when cooking food?	3.66	1.04	
How confident are you in dealing with temperature when cooking food?	3.44	1.14	
How confident are you in handling leftover food in order not to lose nutrients?	3.38	1.14	
How confident are you in dealing with customers having special food/nutrition needs?	3.49	1.08	
For customers with specific food allergies, how confident are you in knowing the foods to avoid?	3.33	1.12	
How confident are you in making food substitutions based on nutrient content?	3.26	1.10	
How confident are you in your ability to provide nutrition information to your customers?	3.47	1.08	

Source: Field survey, Addison (2018)

Scale: 1= not confident, 2= A little confident, 3= Somewhat confident, 4=Very confident, and 5= Completely confident

Note: ^amean, ^bstandard deviation

On the other hand, respondents indicated being somewhat confident in taking decisions relating to these six items: dealing with customers with special food/nutrition needs ($M=3.49$), ability to provide nutrition information to customers ($M=3.47$), dealing with temperature when cooking food ($M=3.44$), handling leftover food in order not to lose nutrients ($M=3.38$), customers who are allergic to some food items ($M= 3.33$), and making food substitutions based on nutrient content ($M=3.26$).

Table 34 shows that the individual confidence statements attracted somewhat to very confident scores which suggests that the RFPS do not possess the full confidence to take nutrition decisions. However, although RFPS had insufficient nutrition knowledge (Chapter seven), they exhibited a moderate level of confidence in culinary nutrition decision making which is enough to initiate the decision-making process. This finding is supported by a similar study in which confidence in nutrition-related decision making in relation to food production was examined in a different context (Zoellner & Carr, 2009).

This part of the chapter discusses the variations in the level of confidence in decision making across the socio-demographic and employment characteristics of the RFPS using Independent Samples T-test and One-way ANOVA. Although the RFPS were generally somewhat confident, evidence from Table 35 shows that with the exception of sex, employment type and experience in current position, significant differences were observed across the other variables.

Specifically, with regard to age, there was a significant variation across the different age categories ($F=10.43$; $p=0.000$). The Tukey post hoc test revealed that respondents aged 25 to 34 years reported higher levels of

confidence (M=3.50) in making culinary nutrition decision than did their counterparts less than 25 years (M=3.24). Again, it was revealed that, respondents above 50 years reported higher levels of confidence than did their counterparts under 25 years.

Table 35: Confidence in Making Nutrition Decision by Socio-demographic Characteristics

Characteristic	Confidence in making nutrition decision		
	Mean	F/t	p-value
Sex		0.508	0.611
Male	3.49		
Female	3.45		
Age		10.43	0.000**
<25	3.24 ^{a1b1}		
25-34	3.50 ^{ab2}		
35+	3.73 ^b		
Marital status		2.45	0.014**
Single	3.41		
Married	3.60		
Education		5.87	0.000**
Primary/JHS	3.12 ^{a1 b1c1}		
SHS	3.37 ^{b2}		
Vocational	3.49 ^a		
Polytechnic	3.68 ^b		
University	3.59 ^c		

Source: Field survey, Addison (2018)

Note: *p<0.050, **p<0.010; ^{a,a1,b,b1,b2,c,c1} where the significant differences exist

It was further revealed that there was statistically significant difference in the level of confidence between the two married groups (t=2.45; p=0.014). Whereas RFPS who were married were very confident (M=3.60) in making culinary nutrition decisions, their colleagues who were single were somewhat confident (M=3.41) in themselves in making the same decisions. Similar to the relationships established between the marital groups discussed in the earlier chapters, the family role played by the married colleagues could have accounted for their level of confidence in culinary decision making at work. It is probably

a spill over of the responsibility they have towards their spouses and /or children that they exhibit at work.

The result in Table 35 additionally revealed significant differences observed in the level of confidence among production staff with different educational qualifications ($F=5.87$; $p=0.000$). The Tukey post hoc test revealed confidence was statistically higher in the Vocational ($M=3.49$), Polytechnic ($M=3.68$) and University ($M=3.59$) groups than the JHS and Primary ($M=3.12$) or SHS ($M=3.37$) education group. This result is also expected and largely connected to the preparation process the RFPS underwent while they were still students. Their pre-service training gives them the opportunity to build their initial confidence levels before encountering the actual work environment. Further, their qualification put them in positions of higher responsibilities which usually goes with some level of confidence.

Significant differences were also observed in the level of confidence among production staff by restaurant types ($t=6.233$; $p=0.000$). Whereas production staff in hotel restaurants were very confident ($M=3.66$), their counterparts in the independent restaurants were somewhat confident ($M=3.23$) in themselves with regard to culinary nutrition decisions (Table 36).

Another notable variation observed was in relation to level of confidence in culinary nutrition decision among production staff with varying years of experience in the food service industry ($F=9.30$; $p=0.000$). In specific terms, RFPS who had had 6 to 10 years ($M=3.75$) or more than 10 years ($M=3.65$) of industry experience reported higher level of confidence than did their colleagues with 1 to 5 years ($M=3.38$).

Table 36: Confidence in Making Nutrition Decision by Employment Characteristics

Characteristic	Confidence in making nutrition decision		
	Mean	F/t	p-value
Restaurant type		6.233	0.000**
Independent	3.22		
Hotel restaurant	3.66		
Employment type		1.359	0.174
Regular	3.49		
Temporary	3.38		
Industry experience		9.30	0.000**
1-5years	3.38 ^{ab1}		
6-10 years	3.75 ^a		
10+ years	3.65 ^b		
Current position		5.42	0.004**
Head chef	3.81 ^a		
Sous chef	3.56		
Cook	3.42 ^{a1}		
Experience in the current position		3.39	0.034*
1-5years	3.43 ^{a1}		
6-10 years	3.68 ^a		
10+ years	3.75		
In-service training on nutrition requirements		4.337	0.014*
<3 hours	3.55 ^{a1}		
3-6 hours	3.27 ^{ab1}		
>6 hours	3.66 ^b		

Source: Field survey, Addison (2018)

Note: *P<0.050, **P<0.010; a, al, b, b1 where the significant differences exist

In addition, the results revealed statistically significant differences in level of confidence in culinary nutrition decisions across the current positions occupied by the RFPS (F=5.42; p=0.004). Whereas the head chefs reported higher confidence (M=3.81) in the decision-making, the cooks were somewhat confident (M=3.42). This may be attributed to the fact that line cooks rely mostly on instructions directly from the sous chefs and indirectly from the head chefs and, therefore, need approval to take some decisions on their own. Thus, to a large extent, the head chefs have more authority to take decisions without necessarily consulting any other colleagues.

The analysis of variance further revealed significant variations in the level of confidence in culinary decision-making across varied duration for training with regard to nutrition requirements ($F=4.337$; $p=0.014$). RFPS who received less than 3 hours or more than 7 hours of training were very confident ($M=3.56$; 3.64 respectively), while their counterparts who received training between 3 to 6 hours of training on culinary nutrition requirements were somewhat confident ($M=3.26$).

RFPS face the need to take nutrition action or apply their nutrition knowledge while cooking to promote healthy eating among their customers. However, this interest is challenging and involves some barriers which must be dealt with appropriately in order to maximise the knowledge accumulated.

As indicated in Table 37, the barrier to nutrition knowledge application scale that was devised for the study returned results with a total mean score of 1.66. This score suggests that the respondents were neutral to the items measured. However, in specific terms, close to a third of the respondents agreed that the menu (30.2%), the lack of training (28.6%) and inadequate production time (28.0%) pose barriers to the application of their nutrition knowledge during food production. and were afraid to make mistakes to apply their nutrition knowledge (26.4%).

These findings shed light on the nature of issues that impede the efforts of the RFPS in making informed decisions. These barriers are largely operational ones and if minimised by the managers, the RFPS could possibly overcome their barriers and maximise their nutrition knowledge application. On the other hand, there were some RFPS who expressed personal barriers. The

RFPS were afraid to implement their nutrition knowledge because they thought the final output would not be desirable.

Table 37: Perceived Barriers to the Application of Nutrition Knowledge

Statement	D	N	A	M ^a	SD ^b	α
	46.3	41.8	11.9	1.66	0.68	0.84
I lack information on culinary nutrition	68.6	10.9	20.5	1.52	0.81	
I do not have the authority to implement what I know	59.4	14.1	26.6	1.67	0.86	
I lack the necessary training to apply nutrition knowledge	58.6	12.9	28.6	1.70	0.88	
I am afraid to get the wrong output	61.0	12.7	26.4	1.65	0.86	
I do not feel welcomed to contribute my knowledge	73.8	13.7	12.5	1.39	0.69	
My supervisor will not allow me to implement	68.6	14.7	16.7	1.48	0.76	
I usually don't get enough time to implement	56.5	15.5	28.0	1.71	0.87	
The menu restricts me from implementing	54.5	15.3	30.2	1.76	0.88	

Source: Field survey, Addison (2018)

Scale: 1= Disagree, 2= Neither Agree nor disagree, and 3= Agree

Note: ^amean, ^bstandard deviation

The suggestion that could be linked to this result is the commercial viability of the business which can only be sustained through the maximisation of resources (such as the raw materials). Hence, there is no opportunity for trial and error. This finding can also be linked to the authority the RFPS have to back their actions. In this study, a quarter of the respondents agreed that they were not in the position to implement their nutrition knowledge (26.6%).

Predictors of Confidence in Culinary Nutrition Decision

Several factors may interplay to influence individuals' level of confidence in culinary nutrition decision. Research has revealed that the top source for confidence in hospitality industry is experience (Oshins, 2014). Experience in this sense was closely linked to the ability to make difficult decisions or perform challenging tasks. Nutrition knowledge has been mentioned severally as a predictor of nutrition knowledge application.

To understand the factors that influence RFPS confidence in making culinary nutrition decision, five antecedents were examined using a multiple linear regression. The predictors that were considered were confidence in seeking nutrition information, nutrition knowledge, industry experience and barriers to nutrition knowledge application. Details of the results from the analysis are presented in Table 38.

The overall model was statistically significant and together, the predictors explained 37 percent of the variance in the response variable ($R^2=0.37$; $p=0.000$). Specifically, confidence in seeking nutrition information had a significant bearing on respondents' confidence in making nutrition decisions. Confidence in seeking nutrition information increased confidence in making nutrition decision by a factor of 0.422.

Table 38: Predictors of Confidence in Culinary Nutrition Decision

Predictor	Confidence in culinary nutrition decision	
	Coeff	SE (pvalue)
Confidence in seeking nutrition information	0.422	0.025**
Nutrition knowledge	0.020	0.015
Industry experience	0.016	0.005**
Barriers to nutrition knowledge application	0.011	0.050
Constant	1.828	0.152**
R^2	0.37	

Source: Field survey, (2018)

Note: ** $p < 0.010$; * $p < 0.050$

It was observed that RFPS with higher levels of confidence in seeking nutrition information were more likely to exude higher levels of confidence in attending to their tasks on daily basis. This finding accentuates an earlier finding in Chapter eight regarding the significant influence of confidence in information seeking on respondents' INL and CNL status. People at INL level show improved motivation and confidence in taking important nutrition actions.

Another variable which accounted for a significant amount of a unique variance in explaining confidence in making culinary nutrition decision is industry experience. It was found that respondents' confidence in decision making increased by a factor of 0.016 for each year of experience gained in the industry. The work in the production kitchens is known to be routine in nature but challenging. So, experience on the job affords the employees the opportunity to gradually master the skills and be in tune and equipped with current industry trends. Through this, they are likely to develop and exude confidence in attending to their tasks on daily basis.

To conclude, all the predictors had positive bearings on RFPS' confidence in making culinary nutrition decisions. However, nutrition knowledge and barriers could not directly account for respondents' confidence in making culinary nutrition decisions. Instead, confidence in seeking nutrition information and industry experience proved to be good predictors. Thus, more efficacious RFPS are more likely to search for nutrition information from different sources and with their industry experience, exude more confidence in taking nutrition-related decisions.

Chapter Summary

This chapter dealt with respondents' confidence in making culinary nutrition decisions. The chapter started with the descriptive statistics on the confidence scale. The barriers faced by RFPS in the application of nutrition knowledge were also described. Finally, a model explaining the predictors of confidence in culinary nutrition decision making was estimated using multiple linear regression. The relationship observed between the collective set of predictors and confidence in making nutrition decision was largely determined by confidence in seeking nutrition information and industry experience.

CHAPTER TEN

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter provides a summary of the entire study. The chapter begins with the summary of the methodology employed to assess the nutrition literacy and knowledge among RFPS. The chapter further presents a summary of the major findings, the conclusions and recommendations of the study. The chapter also presents the contribution of this study to both theory and practice.

Summary

Generally, the literature on nutrition literacy in the context of food service has received very little scholarly attention. Consequently, this study was aimed at assessing the nutrition literacy and knowledge level of RFPS in Ghana. Specifically, the study sought to:

1. identify the sources of nutrition information used by RFPS;
2. analyse the extent to which RFPS search for nutrition information;
3. explore the barriers faced by RFPS in seeking nutrition information;
4. assess the nutrition knowledge of RFPS;
5. assess the nutrition literacy of RFPS;
6. assess RFPS's confidence in making nutrition decisions during food production.

To realise the objectives set for the study, a multi-stage probability sampling technique was employed to select respondents from five regions in Ghana (i.e., Greater Accra, Ashanti, Western, Northern and Central) to

participate in the study. The study depended on structured interviews to collect data from 497 RFPS between December, 2017 and February, 2018. With the support of four field assistants, data collection took place in the selected restaurants within the five regions concurrently. The data was analysed using analytical techniques which included Chi-square Test of Independence, Independent Samples T-Test, One-way Analysis of Variance (ANOVA), Confirmatory Factor Analysis (CFA), and Multiple Linear and Hierarchical Regression Analysis. The analyses were conducted using IBM SPSS Statistics version 25 and Stata 15.

The Model of Nutrition Literacy (Cimbaro, 2008), Levels of Nutrition Literacy (Pettersen et al., 2009) and the Model of Catering System (Smith & West, 2003a) provided the conceptual guidance for this study on nutrition literacy and knowledge among RFPS in Ghana. The assessment components of these three conceptual models provided the flexibility of identifying the domains in tandem with previous studies for assessing the topic under study.

Major Findings

The five leading nutrition information sources identified in this study included the internet, television, nutrition textbooks, cookbooks and the radio. The internet, though, emerged as the single most frequently utilized information source for nutrition-related information. It was discovered that, RFPS on the average, relied on four information sources for nutrition information out of the 12 sources they had to choose from.

It was also observed that among the top five information sources, RFPS made several combinations. The combinations were usually in duos, trios, and

quads. Evidence suggests that, majority of the RFPS combined either television and the internet; television, the internet, and radio; or television, internet, nutrition textbook and cookbook when searching for nutrition-related information.

The findings also indicated that respondents usually consider attributes such as, ease of access, reliability, clarity and expertise before using them. The study revealed that, in relation to the other sources, the internet, television, nutrition textbooks, cookbooks and radio were the top five sources identified as having all four attributes.

The findings also showed that sources perceived as trustworthy are not always the most frequently utilized. This was because Medical doctors and dietitians emerged as the most credible sources, but they were not frequently consulted for nutrition information. The respondents judged the trustworthiness of the sources based on the other attributes and past experiences.

Among the barriers that impeded their efforts in obtaining nutrition information were; the lack of nutrition-related information in other languages apart from English and concerns about the relevance of the nutrition information to food production.

Results from the 10 nutrition knowledge questions revealed that their knowledge was generally low, with 64.4 percent having low nutrition knowledge; 29.8 percent with moderate nutrition knowledge; and only 5.8 percent with adequate nutrition knowledge. Results suggest that, in the area of food preparation and cooking methods, knowledge was found to be quite satisfactory. For instance, 63.8 percent of the respondents recognised that soaking of foods in water dissolves water-soluble vitamins and minerals. On the

other hand, knowledge about food storage and holding was poor. For instance, only a fifth of respondents knew that it is not good to store evaporated milk in transparent containers because it loses the nutrition value.

It emerged from the study that, the RFPS have moderate functional literacy. The low scores recorded for the FNL assessment demonstrates low basic literacy skills (i.e., difficulty in reading or interpreting symbols). Specifically, respondents had challenges deciphering some nutrition words or symbols and jargons used by experts in their messages.

It was detected that the RFPS possessed high INL. They demonstrated having interpersonal skills needed to manage nutrition issues in collaboration with others especially the chef. The respondents also demonstrated the ability to consult multiple sources simultaneously in seeking nutrition information. About 70 percent of the production staff used different combinations of the top five information sources identified in this study.

It was found that they possess critical nutrition literacy. Specifically, the study found that the RFPS often check if nutrition information is valid and reliable; expect their restaurants to serve nutritious foods to customers; and they are willing to take an active role in promoting healthy menu options. Again, they influence their colleagues to apply nutrition information when cooking; likewise, they tended to be influenced by their colleagues.

Further findings from the study showed that the RFPS exuded a moderate confidence level in making culinary nutrition decisions when handling their culinary tasks. The confidence level varied significantly across their socio-demographic and employment characteristics. Evidence points to the fact that the RFPS who were married exuded higher confidence in making

culinary nutrition decisions than those who were unmarried. Again, the head chefs were more confident than the cooks. Finally, confidence in seeking nutrition information and in-service training on nutrition requirements significantly shaped RFPS's confidence in making nutrition decision.

Conclusions

Evidence from this study gives credence to the observation that more production staff are turning to the internet as an information source, whilst relying on nutrition textbooks and cookbooks as trusted arbiters of quality information. The internet will continue to be an even more important source in the future for RFPS at least for their nutrition information search behaviour. The use of the internet and its ability to support RFPS in making informed nutrition decision may help in the dissemination of information about nutrition, particularly nutrient retention.

Evidence from this study reinforces the ongoing attention to the credibility and other important attributes of information sources. RFPS commit more time to sources perceived to communicate very clear messages, considered to be reliable, very accessible and communicate expert information. Hence, these attributes are essential determinants of their source preference and acceptance of the nutrition information.

It can be said that the RFPS relied on multiple information sources for relevant nutrition information. Evidence suggests that they combined two, three or more sources. They also possessed the interpersonal skills needed to discuss nutrition-related issues with their colleagues and supervisors. However, they were hesitant to initiate the discussions with their supervisors. They would

RFPS, performance on nutrition knowledge assessment was not satisfactory, thus a cause for public concern.

It is important to note that nutrition information alone is likely to increase the procedural nutrition knowledge of RFPS. Hence, the respondents need more information on how to handle ingredients and preserve food given the four stages (ingredients preparation, cooking, storage and holding) measured in this section of the study. This would potentially minimise nutrient leakages at these stages of food production to enhance food quality. Fortunately, the category of people studied already possess the culinary skills and exhibited the right attitude towards nutritious food promotion. Hence, all that is needed is for them is to merge nutrition knowledge (if enhanced) with the cooking capabilities to produce healthy cooking practices.

In addition to the confidence in making culinary nutrition decision, a certain limit of self-efficacy is required to attempt a course of action. Hence, finding a moderate level of confidence among the RFPS on that account means that they have the efficacy to take culinary decisions, expend more effort in maintaining those decisions and are likely to persevere in the light of barriers or challenges impeding their efforts. However, they need to be more efficacious so that they can persevere longer when they encounter more compelling challenges.

The study finally concludes that, based on the study context, the capacity to extract, interact and apply information could be of essence in managing nutrition issues than the basic reading skills. This accentuates the usefulness of the theories and conceptual framework that underpinned this study. The theories and conceptual framework advanced the assessment of the study topic to reveal

that an individual's nutrition literacy and knowledge are shaped by both contextual and personal factors.

The NL scale established significant factor validity and reliability. The scale is observed as a valid and reliable tool for assessing nutrition literacy among RFPS; however, the hierarchical theorisation of the Levels of Nutrition Literacy model could not really describe the group studied. To a large extent, this could be predicted because the model stresses individual agency and not a collective agency. It is also important notwithstanding to note that desired outcomes could be obtained by proxy. In this study both proxy and collective agency were exercised more than individual agency.

The SCT and Nutrition Literacy Model are useful in understanding nutrition literacy and knowledge among RFPS. A review of the SCT and Nutrition Literacy Model exposed key variables to empirically understand how RFPS acquire nutrition knowledge from diverse content and behave professionally amidst other team members. The SCT for instance, emphasises that an individual's behaviour is determined by the interaction of personal and environmental factors. It was revealed from this study that, RFPS acquire and build on their knowledge from their daily interactions with, among other things, their colleagues, supervisors, and even the type of restaurant they work for. In addition, the nutrition literacy status of individuals influence how they seek nutrition information. Findings from this study indicates that individuals who have some difficulties in obtaining nutrition information on their own, can leverage on the support from colleagues and supervisors.

Indeed, the kitchen provided a good setting to study nutrition literacy and knowledge. It hosts a heterogeneous group with different educational

background and experiences but share a common interest, which is to serve customers with a nutritious meal. It is a very closed society promoting constant nutrition communication, feedback exchanges and co-creation of food experiences through the exercise of nutrition action. Essentially, the role of the food service industry in providing customers with nutritious food does not only guarantee their customers wellbeing, but also, they will be establishing the foundation for continuous patronage and collective customer-business benefits.

Recommendations for Policy and Practice

The findings from this study provide useful implications for policy makers, nutrition educators and restaurant managers. The applied value of these findings lies in the fact that Council for Technical and Vocational Education and Training (COTVET), Ghana Education Service (GES), National Council for Tertiary Education (NCTE), Hotel, Catering and Tourism Training Institute (HOTCATT), MoH, Food and Drugs Authority (FDA), should incorporate indicators of the attributes of information sources (i.e. reliability, clarity, expertise, and accessibility) into their messages since these attributes were central criteria to the RFPS' evaluation of effective sources for the dissemination of nutrition information. This would enhance the perceived trust in the information sources.

Again, Chefs Association of Ghana, National Restaurants Association and Food and Drugs Authority (FDA) should endeavour to tailor nutrition information to RFPS, whilst taking cognisance of individual differences in nutrition literacy skills. Without this, it may be less effective for those with difficulty in extracting and understanding general nutrition-related information.

The language used in the dissemination of nutrition information targeting this group should also be diversified especially for the non-print sources. The nutrition information should be rich in local content, incorporate pictures, symbols and videos with consideration given to the Ghanaian dialects for ease of comprehension by RFPS with difficulties in extracting information.

Next, policies geared towards increasing nutrition knowledge should be promoted by the various stakeholders (COTVET, NCTE, HOTCATT, GES, MoH, FDA, and Chefs Association of Ghana) among RFPS. The content of the nutrition programmes run at the different educational levels (i.e senior high school and university) should be restructured to incorporate culinary nutrition. Again, tailored nutrition information should consider the food and nutrition-related topics of relevance to the RFPS. This could enable nutrition communicators and educators to understand and know the nature of information to disseminate to people involved in food production in restaurants to prepare them to meet contemporary issues. Specifically, nutrition intervention and education attempts should use sources that meet audience preferences for obtaining nutrition information to maximise effectiveness such as the internet and television. Multiple delivery approach may be useful in the dissemination to enhance the acceptance rate by RFPS, since they consult multiple sources.

Again, Chefs Association of Ghana, National Restaurant Association, MoH, and FDA could harness the potential of the internet to decentralise nutrition information given the fact that there is so much traffic to the internet information environment. Existing online nutrition information providers need to make their submissions more reliable, clear, authored or reviewed by nutrition experts. Offering credible information could increase the confidence

level of RFPS in online nutrition information. Consequently, their trust in online nutrition information communicators would be sustained.

Since concerns were raised about the relevance of the nutrition information in the context of food service operation, there should be more collaboration between RFPS and dietitians. This recommendation should be initiated by the managers of restaurants. This may perhaps make the dietitians more visible to the RFPS who will subsequently seek professional and credible culinary nutrition information from dietitians. In addition, restaurant managers could engage dietitians either on casual basis or permanent basis. If cost of consultation is of essence, then it is recommended that during employee recruitment process, management should consider hiring some core individuals with both culinary skills and nutrition knowledge. Those individuals are described in the literature as either ‘cheftitians’ or “culinary nutritionist”. Another option is to equip their current production staff with applied culinary nutrition requirements.

To practice good nutrition, the various stakeholders mentioned should help RFPS to build on their confidence to search and extract nutrition knowledge. The predictors of the different levels of nutrition literacy assessed in this study should serve as a guide to policy maker, and nutrition educators in understanding and designing nutrition messages and intervention programs that suit their levels. The content can be delivered through formal nutrition education and other less formal exposures to nutrition knowledge and practices. Formal education and practical intervention efforts should aim at impacting their general literacy skills or tailored to target and enhance skills needed at each level of literacy. Consequently, this effort will equip RFPS with the skill to

process nutrition information, develop and exude high confidence in making appropriate decisions regarding culinary nutrition.

Recommendations for Future Research

This study does not herald a quick fix to nutrition communication and education; however, it does reveal problems that require attention from nutrition policy maker, educators and communicators and suggest possible pointers for further inquiry.

The marked interest expressed by the production staff in promoting nutritious food to customers is indicative of a trend for policy makers and researchers to consider. First, it was revealed that the RFPS' deemed it important that their restaurant and other restaurants provide a variety of nutritious menu options to customers. Although it is known that restaurants operate on profit basis, policy makers and researchers must embrace this new expression of nutrition responsibility. The extent to which and the types of nutritious menu items already provided by these restaurants is an important topic for further inquiry.

Second, the RFPS indicated their willingness to take an active role in promoting good health through culinary nutrition. They can effectively assume this role if they are knowledgeable in culinary nutrition especially nutrient retention strategies. This calls for collaboration between chefs, cooks and dietitians. The other option is embracing this phenomenon known as 'chefitians'. This new concept of 'chefitians', although an emerging trend (in the developed countries), can be explored further among RFPS to ascertain if this trend is gaining attention in Ghana. This also raises a question about the

type of culinary nutrition training given to cooks and chefs. There is a need for further investigation into the type of in-service nutrition training given to RFPS in Ghana. This has implications for developing nutrition education or intervention programs for RFPS in Ghana. The content designed should also reflect practical skills to whip up interest of the target population.

Since the internet emerged as the most utilised source for the majority of the respondents, future research could explore how RFPS utilize the internet and particularly when (before, during or after production) they do so. This would broaden our understanding of the level of utilisation and its influence on productivity (nutrition outcome).

Dedicated further research is needed to investigate how effectively to communicate the complex nutrition information to RFPS with limited abilities in seeking and extracting information from many sources and with difficulties in verifying the credibility of such information.

Future research is also needed to explore the specific internet resources, television programs, magazines, newspapers RFPS rely on for nutrition information. It would be necessary to investigate the weaknesses of these specific information sources and how they are likely to impact individuals differently depending on personal factors such as age, educational status among other background characteristics. This information would enable nutrition communicators to target specific information outlets and tailor nutrition messages to the right audience, given their background characteristic.

Contributions to Knowledge

Theoretically, the study adds to the debate on nutrition literacy. More specifically, existing studies on nutrition literacy employing Nutbeam's Level of Literacy model have confirmed the theoretical argument underpinning the model. However, the confirmatory factor analysis revealed that the RFPS possessed moderate functional literacy but high interactive and critical nutrition literacy. This suggests that not everyone proceeds in a hierarchical manner, as suggested by Nutbeam's (2000) Nutrition Literacy model, in attaining the optimal level (Critical Nutrition Literacy).

Next, evidence from 497 RFPS has established the theoretical argument that nutrition communication could result in individual benefits (i.e., health or nutrition outcome) but as a spill over, may also be directed towards population benefit. RFPS generally derive personal benefits from the nutrition messages they are able to extract from the multiple sources counting on their cognitive and interpersonal skills. Subsequently, there is a transfer of the residual benefits from their exposure to culinary nutrition information to the general population (customers). This is expressed through their responsibilities carried out routinely in their professional culinary practice.

In addition, this study adds to the discourse on information seeking by exploring the attributes of information sources. Specifically, the study revealed that RFPS are quite mindful in their evaluation of the effectiveness of information sources. They are likely to evaluate the sources in the light of their perceived attributes (reliability, clarity, expertise, and accessibility) and prefer the credible sources to the popular ones. They are more likely to accept nutrition information from the sources that pass the attribute test successfully.

Finally, the study has highlighted the need to focus attention on nutrient retention strategies in the assessment of nutrition knowledge especially among restaurant food production staff. Much of the general assessment on nutrition knowledge have tended to focus on nutrient content of food, sources and forms of nutrients, nutrition terms, dietary recommendations, food guides, and food labels. In this study, however, emphasis was placed on RFPS' awareness of nutrient retention and confidence in the application of retention strategies during food production. This study has revealed the deficit in nutrition knowledge among RFPS and the need for knowledge improvement so that they can handle their food and nutrition responsibilities accurately.



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APPENDICES

APPENDIX A: QUESTIONNAIRE FOR EXPERT PANEL

UNIVERSITY OF CAPE COAST

FACULTY OF SOCIAL SCIENCES

DEPARTMENT OF HOSPITALITY AND TOURISM MANAGEMENT

Introduction and consent

Dear Sir/Madam,

You have been selected to participate in a study titled “*Culinary Nutrition Literacy and Knowledge among Restaurant Food Production Staff in Ghana.*” Nutrition literacy has been defined generally as the degree to which individuals have the capacity to obtain, process, understand and apply basic nutrition information. As a panelist, your expertise will be needed to shape some conceptual issues in the study. Also, your input will help improve upon the survey instrument to be administered on the restaurant food production staff.

It is hoped that the findings from this study will provide the baseline for further studies in nutrition literacy within the restaurant context and help discover better ways of communicating accurate nutrition-related information to food production staff. This study is solely for academic purposes and you are assured of anonymity and confidentiality. This exercise is in two parts and your input is highly appreciated. It is anticipated that this exercise will be completed in two weeks. For further enquiries, please contact Ms. Evelyn Addison on 0502634014.

Please indicate your specialty: _____

Years of experience in academia/industry: _____

Sex: Male [] Female []

Age in completed years: _____

Round One

Objectives

To establish an independent expert view of the definition of nutrition literacy within the context of food service, identify specific skills needed to measure nutrition literacy domains and the possible outcomes:

- What are your views on nutrition literacy within the context of food service/ restaurant? Please attempt a definition of nutrition literacy if possible
- Provide your views on specific indicators to measure the constructs/domains of nutrition literacy in the context of the restaurant environment. The constructs/domains include *abilities to obtain, process, comprehend and apply nutrition information, including symbols and jargons*
- Please identify possible outcomes that could result from focussed attention on nutrition literacy skills among restaurant food production staff – (for example, food production, staff, customers, restaurant)

Round Two

Objectives

To agglomerate the barriers to the application of nutrition knowledge/information and identify specific questions to measure nutrition knowledge, while emphasising on nutrient retention:

- Identify barriers to the application of nutrition knowledge by food production staff
- Identify some specific questions to measure nutrition knowledge. Emphasis should be placed on conceptual and technical nutrition skills required at each stage of the food flow process to help protect quality through the flow of food.

Please note: You will receive feedback after every round



APPENDIX B: INTERVIEW SCHEDULE (QUESTIONNAIRE) FOR SURVEY

**UNIVERSITY OF CAPE COAST
FACULTY OF SOCIAL SCIENCES**

DEPARTMENT OF HOSPITALITY AND TOURISM MANAGEMENT

Introduction and Consent

Dear Sir/Madam,

I am Evelyn Addison, a student of the Department of Hospitality and Tourism Management in the University of Cape Coast. Pursuing a Doctorate degree in Hospitality, I am investigating into “*Culinary Nutrition Literacy and Knowledge among Restaurant Food Production Staff in Ghana.*” It is hoped that the findings from this study will provide the baseline for further studies in nutrition literacy within the restaurant context and help learn better ways of sending accurate nutrition-related information to food production staff.

In accordance with ethical guidelines that underlie academic research involving human participants, formal consent is required. I, therefore, humbly request your participation in the above-mentioned study. This study is solely for academic purpose and you are assured of anonymity and confidentiality. Your participation is voluntary, and you may refuse to participate in or withdraw from this study at any time. However, your responses and views are germane to the success of this study, as you represent others who may share your knowledge. I would highly appreciate your involvement in this study. It is anticipated that the questionnaire will take 20-25 minutes to complete. In case you would like further clarification about the study before we proceed, please ask.

Do you agree to participate in this study?

Yes No

Date.....

Name and grade of Restaurant.....

Name of Field Assistant.....

5. Which of these attributes do you associate with each of the nutrition information sources?

Sources	Reliable	Expertise	Clear	Accessible
1. Television				
2. Radio				
3. Internet				
4. Colleagues at work				
5. Supervisors at work				
6. Friends/family				
7. Medical Doctor				
8. Dietitian				
9. Nutrition Textbooks				
10. Cookbooks				
11. Newspapers				
12. Magazines				

6. Please indicate the level of trust you place in information coming from these sources.

Sources	Very high	High	Average	Low	Very low
1. Television					
2. Radio					
3. Internet					
4. Colleagues at work					
5. Supervisors at work					
6. Friends/family					
7. Medical Doctor					
8. Dietitian					
9. Nutrition Textbooks					
10. Cookbooks					
11. Newspapers					
12. Magazines					

7. Please indicate the food-related topics that are important to you as a food handler. (*Tick all that apply*)

- | | | | |
|----------------------------------|--------------------------|--------------------------|--------------------------|
| 1. Balanced diet | <input type="checkbox"/> | 8. Carbohydrates | <input type="checkbox"/> |
| 2. Nutrient retention | <input type="checkbox"/> | 9. Minerals | <input type="checkbox"/> |
| 3. Fruits and vegetables | <input type="checkbox"/> | 10. Lowering cholesterol | <input type="checkbox"/> |
| 4. Eating less fat | <input type="checkbox"/> | 11. Weight Loss | <input type="checkbox"/> |
| 5. Food hygiene | <input type="checkbox"/> | 12. Food safety | <input type="checkbox"/> |
| 6. Preparing & storing meals | <input type="checkbox"/> | 13. Food composition | <input type="checkbox"/> |
| 7. Vitamins | <input type="checkbox"/> | 14. Food allergy | <input type="checkbox"/> |
| 15. Other (please specify) | | | |

8. Do you need more information about all the food topics you identified as important?

1. Yes

2. No

9. Please indicate which sources you would like these food- and nutrition-related topics to be channelled through to you?

Food Topic	Television	Radio	Internet	Colleagues	Supervisors	Friends/Family	Dietitian	Medical Doctor	Textbook	Cookbooks	Newspaper	Magazine
1. Balanced diet												
2. Nutrient retention												
3. Fruits and vegetables												
4. Eating less fat												
5. Food hygiene												
6. Preparing and storing meals												
7. Vitamins												
8. Carbohydrates												
9. Minerals												
10. Lowering cholesterol												
11. Losing weight												
12. Food safety												
13. Food composition												
14. Food allergy												

MODULE 2: BARRIERS TO SEEKING NUTRITION INFORMATION

10. Please indicate your level of agreement or disagreement with the following statements where SD= Strongly Disagree, D= Disagree, N= Neither Agree nor disagree, A=Agree, and SA= Strongly Agree.

Statement	S D	D	N	A	S A
When I was searching for nutrition information, ...					
1. it took a lot of effort to get the information I needed.					
2. I felt frustrated during my search.					
3. it was difficult to verify the credibility of the Information.					
4. the information I found was too difficult to understand.					
5. I was concerned about the relevance of the information in my context (restaurant).					
6. there is a lack of nutrition-related information in other languages apart from English.					
7. Any other (please, specify):					

MODULE 3: KNOWLEDGE IN NUTRIENT RETENTION

11. Please read the questions carefully and tick the correct answer.

Statement	T	F
1. It is very necessary to peel vegetables (carrots, cucumber) before cooking.		
2. Bulk cooking helps to retain nutrients in food than batch cooking.		
3. Extended holding of high-quality food has no influence on the flavour, texture, colour and shape.		
4. It is better to store evaporated milk in transparent containers to preserve riboflavin.		
5. The best way to thaw frozen chicken is by submerging it under water.		
6. Washing rice before cooking reduces the vitamins and minerals content.		
7. Soaking of foods in water dissolves water-soluble vitamins and minerals.		
8. Heating food causes nutrient loss, especially vitamin C.		
9. It is highly recommended to add baking soda to green vegetables during cooking because it enhances the colour.		
10. Fruits and vegetables must be exposed in the refrigerator during storage.		

MODULE 4: LEVELS OF NUTRITION LITERACY

12. Please indicate your level of agreement or disagreement with the following statements where SD= Strongly Disagree, D= Disagree, N= Neither Agree nor disagree, A=Agree, and SA= Strongly Agree.

Statement	S D	D	N	A	S A
Functional nutrition literacy					
1. When I read information about nutrition, I find words that I don't know.					
2. When I find materials on nutrition, I need a long time to read and understand the content.					
3. When I read information about nutrition, I need someone to help me understand the content.					
4. When I read materials about nutrition, I find information on nutrient retention too difficult to understand.					
5. When I find materials on nutrition, I need someone to help me read the content.					
6. I find the language used by nutrition and food experts difficult to understand.					
7. I find symbols and jargons (terminologies) used by nutrition experts that I am not familiar with.					
8. I find information from scientific journals too difficult to understand.					
9. I am familiar with the concept of a 'balanced diet'.					
10. I am familiar with 'my plate' or '3 food steps'.					
Interactive nutrition literacy					
11. I have gathered information about nutrition from various sources that I think is relevant for me.					
12. I discuss my thoughts about nutrition with my colleagues at work.					
13. I have changed my cooking methods based on the information about nutrition I have gathered.					
14. I use the internet when I am looking for information about nutrition such as nutrient retention.					
15. I follow cook shows, for example on television.					
16. I often read materials about nutrition (especially balanced diet and nutrient retention).					
17. I readily take initiative to discuss with nutrition experts about nutrient.					
18. I readily take the initiative to discuss with my supervisor and the chef about food and nutrition (for example nutrient retention).					
19. When I want information on nutrition, I do not know which public institutions to go for help.					

Critical nutrition literacy					
20. I often check whether the information I gather about nutrition is valid and reliable.					
21. It is important for me that food service outlets in Ghana provide a good selection of nutritious foods.					
22. I would readily get involved in political issues targeted at making commercial foods more nutritious in Ghana.					
23. I expect my restaurant to serve nutritious food to customers.					
24. I am willing to take an active role in measures aimed at promoting healthy menu options in my restaurant.					
25. I try to influence my colleagues to apply nutrition information when cooking (for example nutrient retention, balanced diet).					
26. I tend to be influenced by the nutrition advice I read from books, newspapers, magazines, etc.					
27. I tend to be influenced by the nutrition advice I get from my colleagues at work.					
28. I tend to be influenced by the nutrition advice I get from my supervisor/chef at work.					
29. I believe that the media's presentation of scientific findings about food and nutrition is correct.					
30. I find it difficult to distinguish scientific information from non-scientific information about food and nutrition.					

MODULE 5: CONFIDENCE IN MAKING NUTRITION DECISIONS

13. Please indicate your level of confidence in making nutrition decisions where NC= Not Confident at all, LC= A little Confidant, SC= Somewhat Confident, VC=Very Confident, and CC= Completely Confident.

Statements	NC	LC	SC	VC	CC
1. How confident are you that you could get nutrition-related information if you needed it?					
2. How confident are you in dealing with food prepping?					
3. How confident are you in storing fresh ingredients to maintain its quality before use?					

4. How confident are you in dealing with time when cooking food?					
5. How confident are you in dealing with temperature when cooking food?					
6. How confident are you in handling leftover food in order not to lose nutrients?					
7. How confident are you in dealing with customers having special food and/or nutrition needs?					
8. For customers with specific food allergies, how confident are you in knowing the foods to avoid?					
9. How confident are you in making food substitutions based on nutrient content?					
10. How confident are you in your ability to provide nutrition information to your colleagues and supervisor?					

MODULE 6: BARRIERS TO THE APPLICATION OF NUTRITION KNOWLEDGE

14. Please indicate your level of agreement or disagreement with the following statements where SD= Strongly Disagree, D= Disagree, N= Neither Agree nor disagree, A=Agree, and SA= Strongly Agree.

Statements	SD	D	N	A	SA
1. I lack information on nutrition.					
2. I do not have the authority to implement what I know.					
3. I lack the necessary training to apply nutrition knowledge.					
4. I am afraid that I will get the wrong output.					
5. I do not feel welcomed to contribute my knowledge to nutrition decision making at work.					
6. My supervisor will not allow me to implement what I know.					
7. I usually don't get enough time to implement what I know.					
8. The menu restricts me from implementing what I know.					

MODULE 7: SOCIO-DEMOGRAPHIC CHARACTERISTICS

15. Sex: 1. Male 2. Female

16. Age:.....

17. Highest level of education completed:

1. No formal education 5. Certificate

2. Primary 6. Diploma

3. Middle/JHS 7. Degree

4. A' Level/SHS 8. Postgraduate degree

18. Have you ever studied food or nutrition based subject or course?

1. Yes 2. No

19. If yes, please specify:

20. Marital status

1. Single 4. Widowed

2. Married 5. Divorced

3. Separated

21. Religious affiliation:

22. Ethnicity:

EMPLOYMENT CHARACTERISTICS

23. What is your employment status?

1. Permanent 3. Internship/Attachment

2. Casual 4. Contract

24. Years worked in the restaurant/food service industry:

.....

25. What is your position.....

26. Years worked in current position:

27. (a) Have you received any in-service training on nutrition requirement?

Yes No

(b) If Yes, indicate the number of hours of in-service training received:

.....

The end

Thank you for participating in this study

**APPENDIX C: CONSTRUCTS AND SCALE ITEMS DRAWN FROM
THE LITERATURE REVIEW FOR THE ASSESSMENT OF
NUTRITION LITERACY**

Constructs	Items	Relevant Sources	
Functional Nutrition Literacy	When I read materials about nutrition, I find words that I do not know	Ndahura (2012); Ishikawa et al. (2008b) Zoellner & Carr, (2009); Zoellner et al. (2009)	
	When I find materials on nutrition, I need a long time to read and understand the content	Ishikawa et al. (2008b)	
	When I read materials about nutrition, I need someone to help me understand the content	Ishikawa et al. (2008b); Ndahura (2012)	
	When I read materials about nutrition, I find information on nutrient retention too difficult to understand		
	When I find materials on nutrition, I need someone to help me read the content	Ishikawa et al. (2008b)	
	I find the language used by nutrition and food experts difficult to understand	Ndahura (2012)	
	I find symbols and jargons used by nutrition experts that I am not familiar with	Ndahura (2012)	
	I find information from scientific journal too difficult to understand		
	I am familiar with the concept of a 'balanced diet'	Ndahura (2012)	
	I am familiar with 'my plate' or '3 food steps'	Ndahura (2012)	
	Interactive Nutrition Literacy	I have gathered nutrition information from various sources that I think is relevant	Ishikawa et al. (2008b); Ndahura (2012)
		I discuss my thoughts about nutrition with my colleagues	Ndahura (2012)
I have changed my cooking methods based on the information about nutrition I have gathered		Ndahura (2012)	
I use the internet when I am looking for information about nutrition such as nutrient retention		Ndahura (2012)	
I follow cook shows, for example on television			

	I often read printed materials about food and nutrition	Ndahura (2012)
	I readily take the initiative to discuss with nutrition experts about nutrition	Ndahura (2012)
	I readily take the initiative to discuss with my supervisor and chef about food nutrition	Ndahura (2012)
	When I want information on nutrition, I do not know which public institutions to go for help	Ndahura (2012)
Critical Nutrition Literacy	I often check whether the information I gather about nutrition is valid and reliable	Ishikawa et al. (2008b)
	It is important for me that food service outlets in Ghana provide a good selection of nutritious foods	Ndahura (2012)
	I would readily get involved in political issues targeted at making commercial foods more nutritious in Ghana	Ndahura (2012)
	I expect my restaurant to serve nutritious food to customers	Ndahura (2012)
	I am willing to take an active role in measures aimed at promoting healthy menu	Ndahura (2012)
	I try to influence my colleagues to apply nutrition information when cooking	Ndahura (2012)
	I tend to be influenced by the nutrition advice I read from books, newspapers, magazines, etc.	Ndahura (2012)
	I tend to be influenced by the nutrition advice I get from my colleagues at work	
	I tend to be influenced by the nutrition advice I get from my supervisor	
	I believe that the media's presentation of scientific findings about food and nutrition is correct	Ndahura (2012)
	I find it difficult to distinguish scientific information from non-scientific information about food	Ndahura (2012)

Source: Author's Construct (2017)

APPENDIX D: NUTRITION LITERACY CONSTRUCT

Nutrition Literacy	SD	D	N	A	SA
Functional Nutrition Literacy (Overall)	8.8	27.9	14.0	34.2	15.1
When I read materials about nutrition, I find words that I do not know (r)	13.3	38.4	11.9	23.7	12.7
When I find materials on nutrition, I need a long time to read and understand the content (r)	9.5	34.2	11.1	34.0	11.3
When I read materials about nutrition, I need someone to help me understand the content (r)	4.4	27.2	14.9	37.6	15.9
When I read materials about nutrition, I find information on nutrient retention too difficult to understand (r)	5.0	25.2	16.9	40.6	12.3
When I find materials on nutrition, I need someone to help me read the content (r)	2.6	18.3	11.5	42.3	25.4
I find the language used by nutrition and food experts difficult to understand (r)	7.8	26.8	15.3	35.0	15.1
I find symbols and jargons used by nutrition experts that I am not familiar with (r)	13.3	37.4	16.1	24.5	8.7
I find information from scientific journal too difficult to understand (r)	8.5	35.4	18.3	26.4	11.5
I am familiar with the concept of a “balanced diet”	5.0	11.5	8.2	44.7	30.6
I am familiar with “my plate” or “3 food steps”	18.3	24.9	15.1	33.6	8.0
Interactive Nutrition Literacy (Overall)	6.6	16.4	14.0	44.2	18.8
I have gathered nutrition information from various sources that I think is relevant for me	7.0	15.7	13.5	47.5	16.3
I discuss my thoughts about nutrition with my colleagues at work	5.6	11.3	10.5	54.9	17.7
I have changed my cooking methods based on the information about nutrition I have gathered	3.0	10.5	8.5	56.9	21.1
I use the internet when I am looking for information about nutrition such as nutrient retention	5.0	16.7	14.3	43.9	20.1
I follow cook shows, for example on television	4.6	7.8	9.3	53.7	24.5
I often read printed materials about food and nutrition	6.8	16.1	12.3	41.6	23.1
I readily take the initiative to discuss with nutrition experts about nutrition	9.9	24.1	19.9	34.2	11.9
I readily take the initiative to discuss with my supervisor and chef about food	5.4	18.3	18.9	41.6	15.7

nutrition					
When I want information on nutrition, I do not know which public institutions to go for help (r)	11.1	27.0	18.3	24.3	19.3
Critical Nutrition Literacy	6.3	12.3	14.8	44.1	22.6
I often check whether the information I gather about nutrition is valid and reliable	4.6	17.5	13.7	47.1	17.1
It is important for me that food service outlets in Ghana provide a good selection of nutritious foods	6.0	7.2	8.5	48.1	30.2
I would readily get involved in political issues targeted at making commercial foods more nutritious in Ghana	10.3	11.3	11.9	41.2	25.4
I expect my restaurant to serve nutritious food to customers	2.8	5.6	6.2	42.9	42.5
I am willing to take an active role in measures aimed at promoting healthy menu	4.8	5.8	7.8	44.3	37.2
I try to influence my colleagues to apply nutrition information when cooking	5.6	8.7	11.5	44.1	30.2
I tend to be influenced by the nutrition advice I read from books, newspapers,	6.2	15.1	16.1	47.7	14.9
I tend to be influenced by the nutrition advice I get from my colleagues	4.8	14.1	18.7	48.5	13.9
I tend to be influenced by the nutrition advice I get from my supervisor	4.8	12.3	16.5	48.1	18.3
I believe that the media's presentation of scientific findings about food and nutrition is correct	6.4	15.7	25.8	41.6	10.5
I find it difficult to distinguish scientific information from non-scientific information about food	10.9	21.3	25.6	33.8	8.5

Source: Field survey, Addison (2018)

Note: (r)=Scale reversed

APPENDIX E: DESCRIPTIVE OF THE NUTRITION LITERACY

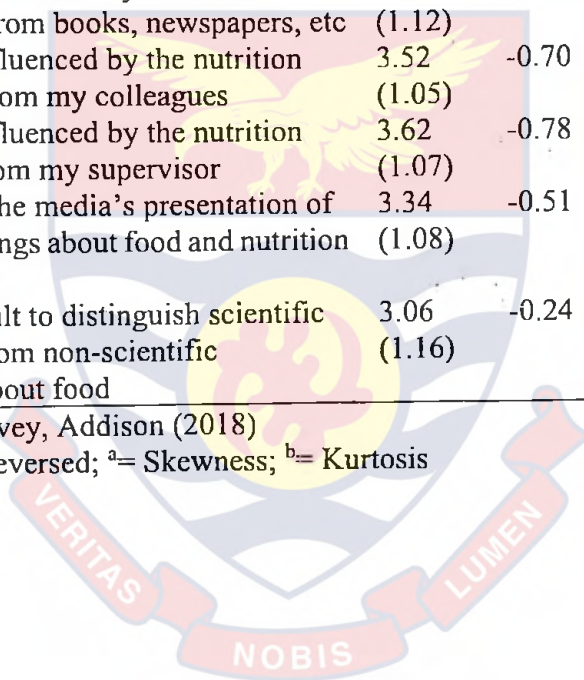
CONSTRUCTS

Constructs	M (SD)	S ^a	K ^b	α
Functional Nutrition Literacy	3.19			0.74
When I read materials about nutrition, I find words that I do not know (r)	2.85 (1.28)	0.28	-1.17	
When I find materials on nutrition, I need a long time to read and understand (r)	3.03 (1.23)	-0.01	-1.25	
When I read materials about nutrition, I need someone to help me understand (r)	3.33 (1.17)	-0.23	-1.09	
When I read materials about nutrition, I find information on nutrient retention too difficult to understand (r)	3.31 (1.13)	-0.30	-0.95	
When I find materials on nutrition, I need someone to help me read the content (r)	3.69 (1.11)	-0.62	-0.63	
I find the language used by nutrition and food experts difficult to understand (r)	3.23 (1.22)	-0.20	-1.11	
I find symbols and jargons used by nutrition experts that I am not familiar with (r)	2.78 (1.20)	0.27	-1.03	
I find information from scientific journal too difficult to understand (r)	2.98 (1.19)	0.16	-1.08	
I am familiar with the concept of a “balanced diet”	3.83 (1.13)	-1.00	0.21	
I am familiar with “my plate” or “3 food steps”	2.88 (1.28)	-0.74	-1.26	
Interactive Nutrition Literacy	3.52			0.77
I have gathered nutrition information from various sources that I think is relevant	3.50 (1.15)	-0.70	-0.42	
I discuss my thoughts about nutrition with my colleagues at work	3.67 (1.07)	-1.01	0.39	
I have changed my cooking methods based on the information about nutrition I have gathered	3.82 (0.98)	-1.09	0.88	
I use the internet when I am looking for information about nutrition such as nutrient retention	3.57 (1.13)	-0.63	-0.50	
I follow cook shows, for example on television	3.85 (1.03)	-1.18	1.10	
I often read printed materials about food and nutrition	3.58 (1.20)	-0.66	-0.57	
I readily take the initiative to discuss with nutrition experts about nutrition	3.14 (1.19)	-0.20	-1.00	
I readily take the initiative to discuss with my supervisor and chef about food nutrition	3.43 (1.22)	-0.48	-0.64	
When I want information on nutrition, I do not know which public institutions to go for help (r)	3.14 (1.31)	-0.03	-1.21	

Critical Nutrition Literacy	3.65			0.85
I often check whether the information I gather about nutrition is valid and reliable	3.54 (1.11)	-0.64	-0.47	
It is important for me that food service outlets in Ghana provide a good selection of nutritious foods	3.88 (1.11)	-1.20	0.89	
I would readily get involved in political issues targeted at making commercial foods more nutritious in Ghana	3.59 (1.27)	-0.79	-0.43	
I expect my restaurant to serve nutritious food to customers	4.16 (0.98)	-1.45	2.01	
I am willing to take an active role in measures aimed at promoting healthy menu	4.03 (1.06)	-1.34	1.42	
I try to influence my colleagues to apply nutrition information when cooking	3.84 (1.22)	-1.04	0.42	
I tend to be influenced by the nutrition advice I read from books, newspapers, etc	3.48 (1.12)	-0.69	-0.32	
I tend to be influenced by the nutrition advice I get from my colleagues	3.52 (1.05)	-0.70	-0.15	
I tend to be influenced by the nutrition advice I get from my supervisor	3.62 (1.07)	-0.78	-0.00	
I believe that the media's presentation of scientific findings about food and nutrition is correct	3.34 (1.08)	-0.51	-0.41	
I find it difficult to distinguish scientific information from non-scientific information about food	3.06 (1.16)	-0.24	-0.86	

Source: Field survey, Addison (2018)

Note: (r)=Scale reversed; ^a= Skewness; ^b= Kurtosis



APPENDIX F: PERCENTAGES SHOWING NEUTRAL CASES

REMOVED

Construct	Frequency	Percentage
FNL	25	47.2
INL	14	26.4
CNL	14	26.4
Total	53	100.0

Source: Field survey, Addison (2018)

