

Nutritional Knowledge and Food Preparation Practices of Volunteer Food Handlers in Schools

Abstract

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The aim of this study was to assess basic nutritional knowledge and food preparation practices of Volunteer Food Handlers (VFHs) in the National School Nutrition Programme (NSNP). The study used a qualitative approach. Individual interviews were conducted with 29 VFHs using semi-structured interviews and participatory observations. The survey was conducted in four school districts of Gauteng; six mainstream primary schools, one secondary school and four special schools participated in the study. Qualitative data were analysed thematically using an inductive approach of coding and characterisation for analysis on Microsoft excel. Findings show that many of the VFHs, as well as their coordinators, lacked good nutritional knowledge. The survey also revealed that nutritional knowledge, food preparation and handling skills were all influenced by educational level and socio-economic status. Most VFHs reported not strictly following the NSNP menus and recipes. In order to improve the nutritional quality of the school meals, the NSNP, needs to re-visit its VFH policies and practical manuals. More training needs to be organised to teach the VFHs about child nutrition and good kitchen practices that enhance food quality. This study has shown that VFHs need adequate training to ensure good food quality.

Keywords: Nutritional knowledge, school feeding, food preparation, food handler, NSNP

Introduction

According to the World Food Programme (WFP, 2019), approximately 66 million primary school-age children attend school hungry in the developing world, and 23 million of these children are from Africa. In South Africa, half of the children's population live in complete nutritional deprivation. The report has indicated that "almost 310 million of the world's school-aged children in low and middle-income countries eat a daily meal at school". In a review of the health and nutrition concerns of school-age children in South Africa, Wenhold et al. (2007) found that young children are most at risk of nutritional deficiencies. However, in the context of food insecurity and social instability, the nutritional problems of young children typically continue into school age or may even be exacerbated. Furthermore, a report by the United Nations International Children's Emergency Fund (UNICEF), WHO, and the World Bank (2020) stated that several school-aged children around the world are not eating enough fruit and vegetables but consume unhealthy snacks that are high in sugar, saturated fat, and salt. As a result, school-aged learners who are malnourished experience short-term hunger and end up not having the requisite ability to learn (Jomaa et al., 2011; Hendricks et al., 2021). It has also been reported that nutrition deprivation causes attention deficits, poor school attendance, as well as health and developmental issues. In a bid to address the issue of hunger amongst school-aged children, the democratic government of South Africa introduced the National School Nutrition Programme (NSNP). The programme was first introduced to schools in 1994 (DPME/DBE, 2016). This programme was initiated as a fundamental component of the Department of Basic Education (DBE) to provide and serve meals to schools situated in communities with low socio-economic status nationwide in South Africa. Over the years, the programme has extended to secondary schools and special needs schools (Department of Basic Education, 2010).

It has been reported that malnutrition and hunger account for nearly half of the death rate of preschool children worldwide, with approximately 26% of undernourished children residing in Africa (Nhlapo et al., 2015). These statistics call for concern, which is why the issue of hunger and malnutrition is one of national importance. The NSNP was launched by the government to alleviate hunger, supplying several nutritive food items, which supports the health of learners and their ability to execute academic tasks (Nhlapo et al., 2015). The NSNP not only focuses on alleviating poverty but also ensures that learners are provided with the proper nutrients needed for learning and growing outcomes (Govender, 2016). School feeding assessments are yet to provide a clear indication that the food provided by the feeding programmes are nutritious and healthy food for school-aged children. This could be attributed to the cooking methods and food preparations of the VFHs. School feeding schemes in South Africa have been developed to contribute to better nutrition of learners and nutrition education, with nutrition being one of the fundamental elements in the NSNP. The VFH plays a key role in achieving this (Devereux et al., 2018).

Literature review

School feeding nutrition programmes play a significant role in food security and nutrition across many countries in the world. In observing an association such as BRICS (Brazil, Russia, India, China and South Africa), one can identify similarities in the mandates on the impact and outcome of school nutrition programmes. In South Africa, the mandate and the objectives of the NSNP include, firstly, contributing to enhancing learning capacity through school feeding. Secondly, to strengthen nutrition education in schools, the programme seeks to promote sustainable food production initiatives in schools (Drimie & Raza, 2016). Like Brazil, the programme targets students attending public schools in South Africa to provide healthy lunches and combat



hunger. Additionally, the Brazilian school feeding scheme is similar to the South African NSNP in that it provides learners with nutritious lunch meals preferably, rice, beans, meat, vegetables and fruit (Drimie & Raza, 2016). In Russia, the feeding scheme programme focuses on a social protection system that includes food security and nutrition. Contrary to Russia, China's focus is on the concerns of child health, obesity, and physical and nutrition education (Egan et al., 2007). The focus of a feeding scheme is of utmost importance and should go beyond seeking to banish hunger. According to More et al. (2017), food-borne illness remains a significant public health concern worldwide. It is thus important to educate VFHs on health issues associated with the distribution of food. According to the World Health Organization (WHO, 2015), about 600 million people get ill from eating food that is contaminated – and this is said to be a yearly occurrence. Of these millions, not all of them survive, with an estimated 420,000 of the victims dying, which includes 125,000 children who are said to be below 5 years of age. In school feeding programs, the requirement for the VFH position does not entail any educational background or formal training in nutrition. As a result, VFHs are most likely to have inadequate nutritional knowledge, as they do not possess any educational background or training in nutrition (Oldewage-Theron & Egal, 2010). For learners to receive nutritious meals during lunch breaks, VFHs must have formal training or education in nutrition. This will, in turn, ensure that the NSNP fulfils its goal of providing learners with nutritious meals (Oldewage-Theron & Egal, 2010). A food handler is also defined as an individual in the food industry whose work line involves direct contact with food, whether in production, processing, packaging, or distribution (Nyamari, 2013). Thus, since food handlers have direct contact with the food, they play a pivotal role in ensuring that food is not exposed to disease-causing bacteria or pathogens. In other words, proper food handling and preparation techniques can enhance nutritional value and food safety.

Feeding a large number of learners is not easy as it needs careful planning, such as how much time it will take to prepare the food and the size and quantity of the school's cooking equipment. VFHs, who are members of the community (usually women), are tasked to (i) prepare and serve food to learners, (ii) keep the preparation area clean, (iii) clean cooking and eating utensils, (iv) make water available for learners, to wash hands. VFHs are appointed by the School Governing Bodies (SGBs) and receive a monthly stipend (DBE, 2009). In South Africa, the cooking methods are diverse and unique to specific ethnic groups. Food preparation methods differ in many parts of the world based on local environments. Cooking methods comprise roasting, boiling, baking and frying. In rural and traditional parts of Africa, the cooking methods consist of stretching scarce food sources. People tend to use what is available, and thus, affordability directs the food preparation methods utilised. The spicing of food is used to add flavour to the food. This plays a major role in the school children's general acceptability of the meals. Kuyu and Bereka (2019) highlighted that indigenous food preparation, preservation, and storage methods have been passed from one generation to another. Indigenous food preparation and handling methods are often undermined and not utilised. According to Pereira et al. (2019), undermining indigenous knowledge is linked to the adoption of modernised practices and could therefore have impacts on health due to the food being less nutritious. Sievert et al. (2019) found that the nutrition transition does not only involve a shift from more traditional to globalised and processed foods, but it also has an influence on the way people source and prepare food. In Africa, the nutrition transition is associated with immense rural-urban migration and rapid urbanization. Crush & Battersby (2016:132) stated, “men and women migrate for the same reasons, but their relative importance differs; economics is more important to men and family/living conditions are more important to women”. This affects the practices of the VFHs to a large extent.

Furthermore, Young et al. (2019) suggest that training and education programmes are essential strategies to ameliorate the behaviours and behavioural precursors - for example, knowledge and attitudes of food handlers. Baloyi et al. (2023) and Egan et al. (2007) alleged that training could advance employee performance, increase fulfilment and assurance, concentrate on weaknesses, improve reliability, push up productivity and obedience to the quality standards, and enhance the programme's reputation and profile. To keep to acceptable hygiene standards, VFHs are required to wear light-coloured protective clothing such as aprons and headgear (Egan et al., 2007). According to the FAO, IFAD, UNICEF, WFP & WHO (2017), nutrition education plays an essential role in nutrition's impact on food security, community nutrition and health interventions. Nutrition education considers dietary practices and food consumption by looking at food habits and food purchasing, environmental conditions, food safety and food preparation. All these are influenced by nutrition education (FAO, IFAD, UNICEF, WFP & WHO, 2017). The main aim of nutrition education is to strengthen particular nutrition-related practices or behaviours to change habits that contribute to poor health. This is done through motivating people to change and establishing necessary food and nutrition behaviours for the promotion and protection of good health. Nutrition education is very important for VFHs if they are expected to prepare balanced and safe meals for learners. Thus, this study sought to assess the nutritional knowledge and food preparation practices of VFHs in Gauteng schools.

Methods

For this research, a description of the nutritional knowledge of VFHs, and the factors that may affect nutritional knowledge among food handlers was done. This study's research design followed a descriptive (qualitative) approach. The access to research participants was gained through various data collection methods; the methods are presented in detail below. Field notes, exact transcripts from 29 in-depth interviews, documentary analysis, and participant observation generated data for this research. Furthermore, the qualitative technique allowed participants to respond in a way that indicated their perceptions/opinions. A cost-effective method was utilised to analyse the interview questions and checklist from the participant observation. Microsoft Office was employed for data analyses. The field notes/ transcripts from the interviews were transcribed into electronic format via Microsoft Word. The information was then transferred to Microsoft Excel to extract and gather themes from the interviews and the participants' observations. Moreover, an inductive approach was applied for the purpose of coding



and categorisation for analysis. This process ensured that the data analysed was the same as the data collected during the fieldwork stage. Lastly, the data collected was analysed and grouped into thematic areas (Bree & Gallagher, 2016). The targeted population was NSNP food handlers and the sample size was 11 schools, i.e., 5 primary schools, 2 secondary schools and 4 learners with Special Education Needs (LSEs) schools based in the Gauteng Province. The sample unit of the study were adult women and men who live and reside in Gauteng. In this study, semi-structured interviews and participant observations were used to gather data. The data gathered from the audio recordings was then transcribed and coded manually using Microsoft Word and Excel. The following themes were identified from coding:

1. Basic nutritional knowledge
2. FBDGs and balanced meals
3. Utilisation of menus
4. Knowledge of cooking preparations and food handling practices
5. The influence of socio-economic factors on nutritional knowledge
6. The influence of training and education on nutritional knowledge

Table 1: Thematic evidence derived from open coding themes:

Themes	Descriptions
A) Nutritional Knowledge	Food-Based Dietary guidelines
	Balanced meals
	Preservations and storage
	Food handling and preparation
B) Training	Formal training
	NSNP training
	Educational level
	Previous work
	Good hygiene practices
	Clean cooking facilities, utensils
C) Socio-economic challenges	NSNP
	Unemployment
	Gender roles
	Poverty
	Improvising
	Lack of opportunities
	Government grants
	Vulnerable children
	Culture & tradition
	Adapting to change
D) Food preparation and handling	Menus
	Food preparation
	Hygiene and safety
	Cooking procedures
	Separation of food
	Protective clothing
	Clean and neat environment

A qualitative descriptive method was appropriate for this study based on the research objectives. The qualitative approach was used to elicit an in-depth understanding of the various schools' knowledge levels and food handling/preparation practices of the VFHs. The questions were structured to gather data on their nutritional knowledge and food preparation practices of the VFHs. Before the questions were put in their final form, a pilot study was conducted to remove uncertainties in the choice of words and phrasing. The survey instruments were piloted at three primary schools in Gauteng Province; these were excluded from the main study afterwards. The data was collected through interviews, documentary sources, and observations.

Inclusion criteria: Public primary schools (NSNP Quintile 1 – 3), volunteer food handlers in Gauteng province only.
 Exclusion criteria: High schools, Private schools, parents, schoolchildren, teachers, principals

Informed consent and data privacy: All respondents were informed about the purpose of the study beforehand and were asked to sign two copies of the Informed Consent Form, one for the respondent and one for the researcher. The form guaranteed the respondents confidentiality and indicated that participation in the research was entirely voluntary and that the participant could withdraw at any stage of the process at no expense or harm to him or her. Permission to conduct the interviews at the sampled schools was done telephonically. At the schools, respondents were prompted to carefully read and understand the objectives of the study before proceeding with the interviews. Afterwards, they all signed an informed consent form attached to the survey instruments. The study participants were assured that all data would be used only for research and recommendation purposes. Ethical approval for the study was applied for and obtained from the College of Business and Economics (CBE) Ethics Committee, University of Johannesburg, with Ethics number - STH083. Permission to access the schools and conduct the study was sought from and granted by the Gauteng Department of Education. All ethical principles were abided by.

Results

Socio-demographics of the study participants

Twenty-eight food handlers were female, representing 96.5 %, there was just one male VFH in this study population. Also, 52 % of VFH were between the ages of 36 and 45 years, the second-highest group (31%) was those aged between 26 and 35, and



none was aged below 25 years. All the VFHs were black; there were no white, Indian and coloured volunteer food handlers. Table 4.1 shows that all (100%) of the food handlers were employed only as VFHs and did not hold any other jobs. Majority of them (69%) had worked in their current job for over a year. Over half (62%) of the VHF had obtained grade 11 and lower grades; the findings show that only 3 of the VHF had obtained a National Diploma. None of the respondents had obtained a bachelor's degree.

Table 2: Socio-demographics of the study participants (n=29)

Variable	Sub-variable	Frequency n (%)
Sex	Female	28 (96.5)
	Male	1 (3.5)
	Prefer not to say	0 (0)
	Total	29 (100)
Age group	18 – 25 years	0 (0)
	26 – 35 years	9 (31)
	36 – 45 years	15 (52)
	> 45 years	5 (17)
	Total	29 (100)
Marital status	Single	26 (90)
	Married	3 (10)
Ethnicity	Black	29 (100)
	White	0 (0)
	Indian	0 (0)
	Coloured	0 (0)
	Total	29 (100)
Employment status	VHF job	29 (100)
	Others	0 (0)
	Total	29 (100)
Years on current job	Less than a year	9 (31)
	Over a year	20 (69)
	Total	29 (100)
Highest educational qualification	Grade 11 or lower	18 (62)
	Grade 12	8 (28)
	National diploma	3 (10)
	Other	0 (0)
	Total	29 (100)

Training and work experience

Regarding training, a high number of food handlers reported that they did not receive adequate training from NSNP and DBE. One VFH had this to say regarding training received: “we just went on a one-day workshop. At the workshop they showed us the menu and told us that children should wash their hands before eating their meals. We were also trained to prepare the correct quantities and time-keeping.” She further revealed that she received training from her previous work, which was in the hospitality sector; “I also learned about food preparation and cleaning the utensils we use. We were taught to wash our hands every 20 seconds when we sneeze and come back from the toilet”. A number of the VFHs mentioned that they were trained by the previous cooks. The training only lasted a week and it rarely focused on nutritional education but mainly on food preparation. Before being employed at the schools as VFHs, only a few of them had received some training on nutrition and food preparation. Hence, the findings reveal that most of the VHF received their training from their previous work.

The second food handler from the same school revealed that they would appreciate it if they could be provided with training every 6 months just to refresh their minds: “It would be great to have workshops every six months to refresh our brains. In addition, when we go to workshops, we can share knowledge with other food handlers.” Food handlers from a school in district EKU, revealed that the training they received from their school was from the food handlers that are employed full time by the school. They emphasised that they did not receive training and they believe that training should be provided because, “it will help us to have more knowledge in nutrition and food preparation”. In another school in that same district, VHF revealed that they did receive training from their school. One of the VFHs said, “we were taught about hygiene and checking the storage and preservation of the food, and also how to prepare foods such as soya. They also taught about washing the vegetables before we cook them and not serving leftover food”. However, they believe that the training they received is not enough and sufficient: “I don’t think it is enough because every year food evolves and there is a lot of instant food. Getting training will help us to keep up and adapt to the changes”, mentioned one of the food handlers.

Food handlers from district TSH, school EMS, revealed that they did receive training, and mentioned that they were trained twice: “we were trained on how to prepare food and not remove the bones from the tin fish as it has many ‘vitamins’. We were also told not to use too much oil when preparing food for the learners. We were also taught us not to use a lot of salt when cooking”. The VHF further revealed that they measure the food/ingredients when cooking. Lastly, food handlers from a school in district WRM, revealed that they did not receive any formal training from their school, however, the training they have is from their previous work: “I worked at a popular store and I learnt how to cook there, I also learned about food safety and hygiene”.

Cooking procedures, food handling and preparation

The observations aimed at identifying and understanding the cooking procedures and food handling of VFHs. Based on the observations regarding cooking procedures, food handling and preparation as well as hygiene and food safety, the participants

seemed to be aware of what they needed to adhere to when preparing food. A food handler from TSH district, described the food and safety, cooking procedure and food preparation measures they adhere to before they start to prepare the food. Before the VFHs start preparing food, they all seem to wash their hands with soap. Out of the 11 schools observed, 16 of them re-wash the pots. A food handler from WRM said, “when we arrive at school in the morning, we are required to re-wash the pots and soak them. We always wash our hands and we make sure that the dishtowels are also clean. Everything we use we wash so that it is clean, things like vegetables”. Furthermore, VHF from COJ district, highlighted that, food preparation is knowing about hygiene and safety. For example, wearing the correct clothing gear and removing jewellery” and “Food preparation is preparing, chopping the food and planning your meal”. A food handler from the ECU district pointed out that, “food preparation is knowing the correct steps to follow such as the temperature and the diseases that come in the food.” She further highlighted that food preparation has to do with thinking ahead, preparing the food before you cook it. A second food handler from ECU district said, “food preparation is also preparing your working station and laying all the required utensils and lining them in the prep station. It is also washing the vegetables before they are prepared.”

Furthermore, the study detected that none of the schools read food labels and applied food label knowledge. This is due to the incomplete food label information on the schools’ food supplies. The soya provided does not entail any food label information. In terms of the preparation of tin fish, none of the schools’ VHF read the labels and applied food label knowledge. Looking at the utilisation of menus, it appears that 99% of the schools check the menu when planning for their meals. However, the menu is not always followed as some schools sometimes have low food supply, and thus prepare and cook according to availability. It was also noticed that, in most schools, the food handlers did not measure their spices and the amount of oil they use. This is because they did not have measuring equipment. Moreover, at times food supplies arrived late, so schools have to make do with whatever is available and sometimes this may be inadequate. In addition, the food that is received does not come from the vegetable garden. However, one of the school gardens provides approximately 15% of the produce for the feeding programme and the other gardens supplement their feeding schemes when there is enough produce from their gardens. It was also observed that during lunchtime, serving meals was rather chaotic with children running around and pushing each other to get a plate. Out of the eleven schools, nine schools had a strict policy where meals are distributed according to learners’ Grades. The two schools which seemed chaotic were secondary schools. Learners are advised to come with their own containers or plates. All the learners from the schools under study brought their own lunch containers.

Observations Checklist

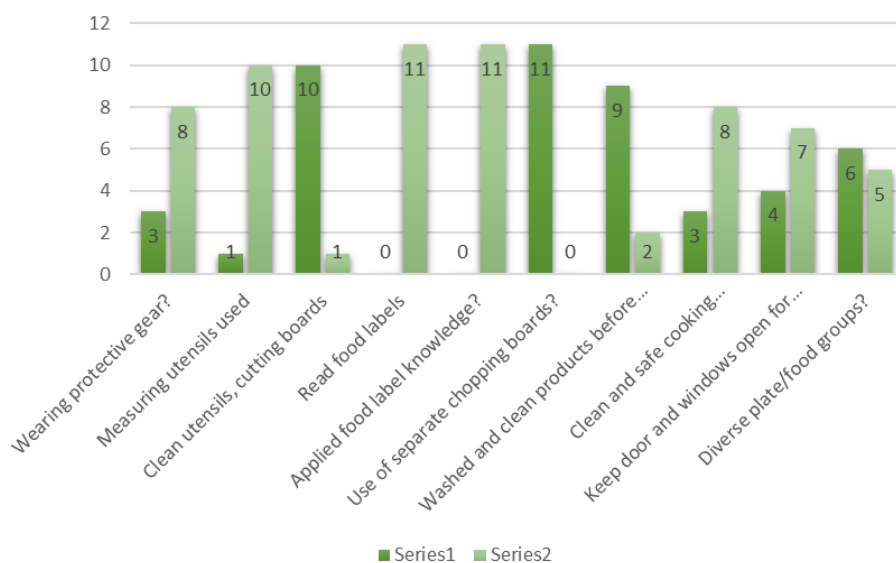


Figure 1: Observational checklist showing participants’ cooking/food handling practices

VFHs’ knowledge

The responses from the participants revealed that the food handlers seem to lack proper knowledge of nutrition. The findings also revealed that the food handlers’ social setting and cultural background has influenced their way of cooking and preparing meals. It is evident that the procedures and methods in handling and preparing food were limited as the VFHs applied their general knowledge learned from their childhood and households. In addition, all the 29 participants revealed that lack of education, knowledge, and resources are the reasons behind poor nutritional knowledge. Furthermore, the findings revealed that the training provided by the NSNP is insufficient. The findings revealed that food handlers in all four districts had an idea or had an understanding of what nutritional knowledge is. Regarding FBDGs, the majority of the food handlers had no idea what FBDGs are, however, a food handler from the District TSH, PLSN described FBDGs as “They are meals that consist of orange and green vegetable. There should be three kinds of vegetables”. A VFH from COJ, IPS district described FBDG as “It is the different food groups and a balanced meal.”



Regarding the term balanced meals, the results show that the food handlers did have some basic knowledge when it comes to balanced meals. A food handler from COJ district defined a balanced meal as “A balanced meal has seven nutrients such as vitamins, starch, dairy products etc.” Another food handler from COJ, ELSEN described a balanced meal as, “A balanced meal is having all five groups on your plate. On your plate, there should be proteins, carbs and fruits and veggies”, she further explained that they serve balanced meals to their learners by ensuring that they measure the amount of oil and salt they use. However, they did point out that they do not have measuring cups and normally use their own “logical” calculations when measuring. The food handler said, “We do not use a lot of oil. We use salt in moderation and when we measure, we do not use any measuring cups”. A food handler from TSH, PLSN described the balanced meal as “There must be vegetables, starch and proteins. It is the food pyramid,” she further mentioned that she believes that they serve balanced meals to the school children because they did not cook the same meal every day. However, some food handlers from district WRM, MPS highlighted that they did not serve balanced meals to learners. This was due to a shortage of stock and late deliveries, and thus, have to improvise and prepare whatever was available. When asked if they refer to the menus and manuals before food preparation, a food handler at COJ, PKLSEN responded, “Not really because now we know what to cook every day. When the products are not delivered on time we still need to cook.” When asked if the meals prepared for the learners are balanced, a VFH at WRM, ABPSS mentioned “No, it is not so balanced because we cook only one vegetable. We make butternut but we only steam. One type of vegetable does not make the meal balanced.” All participants believed that more education and training could encourage food handlers to have the relevant information and knowledge for the school feeding scheme to fulfil its mandate of providing nutritious meals to learners.

Discussion

The findings of this study show that the VFHs exhibited poor nutritional knowledge as regards food-based dietary guidelines (FBDGs) and balanced meals. Mick et al. (2012) alleged that nutritional knowledge or the ability to apply nutritional knowledge is an important driver of behaviour. In this study, when asked about FBDGs, many VFHs somehow lacked knowledge of what FBDGs are and why it is important for them to be knowledgeable about FBDGs, especially since they work with children. FBDGs were set out to address South Africans' inadequate dietary and eating patterns. They are dietary recommendations that are aimed at raising awareness of food and beverage choices. The guidelines encourage consumers to choose the correct food that lowers the risk of Non-Communicable Diseases (NCDs) and emphasise foods that constitute an adequate diet (Vorster, 2013). According to Mötteli et al. (2017), countries worldwide have established their own dietary guidelines; this is to provide individuals with practical information about a healthy and balanced diet. Even though dietary guidelines are designed around cultural circumstances, many of them focus on food hierarchy and proportion sizes. Balanced diets encourage the consumption of a large portion of vegetables and fruits and a lesser portion of carbohydrates and protein. Findings revealed that only a few food handlers knew and understood the term balanced meal. Mötteli et al. (2017) further described a balanced meal as including all five-food groups on the plate as well as including seven nutrients such as vitamins, fruits and vegetables, carbohydrates, dairy products, and protein. From observations, some research reports that nutrition knowledge has a large influence on food-related behaviours and dietary choices (Onyenweaku, 2022), while others seem to say otherwise (Mick et al., 2012).

This study revealed that many VFHs do not have measuring utensils, and they just use their own calculations to prepare the school meals. Some VFHs, however, highlighted that they do not serve balanced meals and do not follow manuals to ensure that they prepare them. They cited a shortage of stock and late deliveries as the reasons for this and mentioned that this forces them to cook whatever is available. This is not very similar to the report received from VFHs, teachers, and principals who were interviewed in various SA provinces (Onyenweaku & Kesa, 2023). They reported that supplies were received in good time and the schools were able to follow the NSNP and TBF menus to a great extent. Furthermore, Mick et al. (2012) pointed out that nutritional knowledge is closely linked with the reading of nutrition information on food products. Even though this is the case, it has been argued that these kinds of effects may prove to be unhelpful if consumers with high levels of nutritional knowledge believe in purchasing and consuming processed food. For example, if the nutrition information of frozen vegetables states that the vegetables must not be boiled for more than fifteen minutes and the instructions are not followed, then the effects of the nutritional information on food products are not effective (Mick et al., 2012). Fresh food, however, does not have such labels and often people cannot read and write, making this source of knowledge inappropriate for some. The findings here showed that the VFHs did not understand food labels, nor did they apply any food label knowledge.

This research also investigated and observed VFHs food handling and cooking procedures. The results showed that the participants seemed to be aware of cooking procedures, food preparation, as well as hygiene measures, and from observations, they adhered to these when handling food. The South African Standards and Requirements for Food Premises (SASRFP) policy, as cited by the DOH (Department of Health, 2002), suggested approaches to food safety and preparation sites. Food preparation places should process food hygienically to avoid contamination. Walls, ceilings, and floors ought to be in order and clean at all times to avoid food adulteration. This implies that the cleanliness of a cooking area and cooking facilities will serve as a preventative measure to ensure that no insects enter areas where food is being prepared. Regarding food safety, according to the WHO (World Health Organization, 2015), adequate cooking times and temperatures should be followed, and a thermometer should be used for checking the internal temperature of cooked food to ensure safe and nutritious meals. The VFHs further highlighted that food preparation has to do with thinking ahead and preparing the food before you cook it; they also highlighted the importance of food safety and hygiene when preparing food. Some VFHs highlighted that, "it is very important to follow hygiene standards when preparing and cooking food. For example, wearing the correct clothing gear and removing jewellery." The South African Standards and Requirements for Food Premises (SASRFP) policy, as cited



by the DOH (Department of Health, 2002), states that cooking places should be well-ventilated artificially or naturally and have sufficient lighting. Policies continually highlight that cooking or food preparation sites ought to be provisioned with a water supply system and appropriate water disposal systems that the local municipality has approved. Also, it is important to store perishable foods properly to prevent microbial contamination. This can cause a serious food-borne disease outbreak, which could be very detrimental to the health of children. Onyenweaku and Kesa (2023) suggest the provision of refrigerators to school kitchens to encourage proper food preservation and reduce food waste.

The utilization of the menu was also explored. A study by Yoon and George (2012) found that individuals with good nutritional knowledge process information on menus better than others. The findings of the study showed that 90% of the VFHs refer to the menus when preparing meals. It appears that VFHs who have worked for more than a year do not refer to the menus because they have become familiar with what to cook daily. Evidence also shows that VFHs cook according to their knowledge to make the food more pleasing for the learners. Some VHF said that they usually suggested and tried different ways to improve the menu because learners only enjoyed some meals when prepared in a certain way. For example, the learners were reported not to enjoy the soya, so the VHF try to prepare it to be more appealing. This is similar to the report of Kesa and Onyenweaku (2024) who observed that many of the learners did not accept the soya well. The VFHs who have worked less than a year responded that they always refer to the menu. However, some VFHs mentioned that the menu is helpful and beneficial when preparing meals as it helps them know the amount of ingredients to use and the quantity of food to be prepared.

Many of the VFHs' employment is based on what is available and not their choice (based on formal education and skills). Jonah & May (2019) found nutritional knowledge varies in geographic areas - urban areas, formal rural areas, and tribal areas. The study further highlighted that nutrition and diet-related inequalities were higher in rural areas. This can be associated with the wage gap that exists between urban residents, who lack the requisite skills to participate in urban economies. The VFHs also highlighted that they usually use the general knowledge they get from home and newspapers when preparing and handling food to ensure its safety. It is really important for VFHs to be adequately trained to improve the learners' nutrition and health outcomes (Kristjansson et al., 2016).

Recommendations to stakeholders

The following suggestions are given to improve the nutritional knowledge, food handling and preparation practices and generally the quality of the in-school nutrition to ensure better health outcomes for the learners:

- i. The VFHs need further training on portion per serving, food preparation skills, basic nutrition knowledge and hygiene and safety skills. This will aid in improving the quality and quantity of food served at the schools.
- ii. Provision of larger kitchen space and better storage facilities such as refrigerators in order to reduce food waste and ensure consumption of safe foods, is required in many schools.
- iii. Sponsoring school gardens again will help to provide more fresh herbs, fruits and vegetables. These gardens are very useful and can be used to promote nutrition education among the schoolchildren.
- iv. Schools need to avoid deviating from the menus when possible and to ensure that a variety of foods are served to the learners. The suppliers should also ensure supplies get to the schools on time in order to avoid deviations.

Conclusion

The findings of this study show that nutritional knowledge is often overlooked as a prerequisite in the food industry due to the standards/requirements that come with it. Their upbringing and educational level largely influenced the level of nutritional knowledge of the VFHs. It is important that VFHs have the relevant information and knowledge for the school feeding programmes in order to fulfil the mandate of providing nutritious meals to learners. They need to be well-trained periodically on preparation of safe and healthy meals and how to handle food properly to prevent microbial contamination. Furthermore, these school meals are essential for learners because, in some cases, they are the only meals that some may have in a day. Not only do the school feeding schemes fill the gap in alleviating hunger, but they also aim to ensuring that learners are provided with the nutrients they require for proper growth and better academic performance. Adequate and regular training of VHF should be factored into the school feeding programmes in order to enhance nutrition knowledge and improve their culinary skills.

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