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RESEARCH ARTICLE

Nutrition knowledge and attitudes of street food handlers in Mangaung Metro Municipality in free state, South Africa

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ABSTRACT

Nutritious and safe food is essential for good health. However not all food handlers especially in the street food trade know how to or are willing to prepare nutritiously balanced meals. Many non-communicable diseases are associated with poor diets, this therefore implies that habitual consumers of street vended foods could be at risk. This study therefore aimed to analyze the nutrition knowledge and attitudes of street food handlers as well as the food types sold. The study followed a cross-sectional, quantitative design using a peer reviewed questionnaire to obtain street food handler demographics, nutrition knowledge, attitudes and food types sold. Questionnaires were administered to 100 food vendors (June–August 2022) with more females (57%) than males (43%) in the sample. The nutrition knowledge responses given by vendors are indicative of a satisfactory knowledge level. None of the participants scored below 33% (i.e., ≤5/15). The vendors had positive attitudes towards nutrition. However, the meals they sold such as fat cakes and processed meats, were mostly fat and energy dense, and these have a potential to cause health issues such obesity and cardiovascular diseases. Studies on nutrition knowledge especially among this demographic are significantly fewer, and no other study of this kind has been conducted in the Free State.

Keywords: nutrition; food safety; street vended food; knowledge; attitudes; non-communicable diseases

1. Introduction

Street vended foods by their very nature have the potential to prompt incidences of foodborne diseases and non-communicable chronic illnesses. Due to several contributing factors such as the choice of cheaper ingredients, which are often of dubious quality, street foods are often of poor chemical composition. Additionally, poor preparation and handling practices and insufficient knowledge about nutrition by vendors further contribute to food safety risks associated with street vended foods. This can be exemplified by high levels of added sugar, fats, carbohydrates, and salt[1,2].

The rapid epidemiological transition (a gradual increase in non-communicable chronic diseases) has been attributed to both nutrition transition and urbanization[3,4]. Nutrition transition is described as the broad changes in the pattern of human diet that have occurred across time and space[5]. In some parts of the world

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with high levels of poverty, public health challenges revolved around protein-energy malnutrition, other micronutrient deficiencies and infectious diseases, and this it usually connects into a vicious cycle[6]. However, more recently, the scope of public health issues has been widening to include prevalence of diseases caused by overconsumption of fats, salt and added sugars[7]. Regrettably, street vended foods have frequently been identified to commonly have excessive amount of these components.

The broader street food ecosystem includes, consumers, municipalities, regulators and street food handlers. However, street food vendors are the key role players in ensuring the provision of safe and nutritious food to consumers. Their involvement as the preparers of street foods makes it paramount that they are knowledgeable about good nutrition as well as food safety. Some of the concerns raised by Steyn et al.[1,8] are that street foods are generally high in salt and are energy dense. This contributes immensely to weight gain and exposure to health risks associated with overconsumption of total fats, saturated fats, salt and refined sugars. Conversely, street foods sometimes provide insufficient nutrition. Van't Reit[9] found that total energy provided by street vended foods in low-middle income homes and slums was below daily recommended intakes of 2500 kcal/day for men and 2000 kcal/day for women[10]. Insufficient access to nutritious food is a major public health issue in developing countries, affecting mainly members of vulnerable groups (children, the elderly, pregnant women and people with preexisting conditions such diabetes and other chronic illnesses).

The population of Mangaung Metro Municipality is roughly 861,651 and 36.6% of this population is reported to be living below lower poverty lines while 25.3% are unemployed[11]. This therefore highlights the significant number of persons that might depend on street vended foods as a source of nutrition due to low socio economic status. Thus, the aim of the current study was to assess the nutrition knowledge and attitudes of street food vendors in Mangaung Metro Municipality (MMM), an aspect that has not been explored in this region and many other regions of South Africa.

2. Methodology

2.1. Study design

The study utilized a cross-sectional, quantitative design. A peer reviewed questionnaire[12] was used to obtain the street food vendors' knowledge, attitudes, demographic characteristics and types of food sold from February to end of March 2022. This method was used purposefully to quantify the knowledge and attitudes of the participants.

2.2. Sample size and sampling method

The study involved 100 stationary street food vendors with stalls around the towns of MMM-Bloemfontein (23), Botshabelo (20), Dewetsdorp (16), Soutpan (10), Thaba Nchu (15) and Wepener (16). Initially 103 food vendors fitting the criteria (stationary and selling ready to eat meals) were approached. However, three of them terminated their participation. Only stationary food vendors were chosen because they are easy to track due to their permanency. All vendors were purposefully selected and were involved in the study depending on their willingness to participate. In the case of stalls with more than one vendor working, only one vendor was asked to volunteer to participate in the study. In order to minimize bias, simple random sampling was used for the selection of participants since there is no official documented number of street vendors in this area. Participants were fully encouraged to read the informed consent sheet-which was written in the predominantly spoken languages in Free State, Sesotho and English-and to seek clarity from the researcher before participating in the study.

2.3. Data collection

A questionnaire was used to test the nutrition knowledge and attitudes of food handlers. To assess each of the components, the questionnaire was split into two sections (one assessing knowledge and the other assessing attitudes), with an additional four sections that were used to elicit the demographic characteristics of the vendors, food items sold, available facilities and the day-to-day operational activities. All questionnaires were administered by the researcher and an assistant in Sesotho as it is the most predominantly spoken language in the Free State.

The demographic characteristics obtained from the vendors included their age, gender, country of origin, ethnicity, and level of education. The nutrition knowledge questionnaire consisted of 15 questions which related to the street vendors knowledge about salt and sugar content, legumes and nuts, milk and meat, starchy foods, fats and oils as well as fruits and vegetables. For each correct response provided, 1 point was allocated, and no points were allocated for incorrect responses. For a person to get a 100% score, all 15 questions must have been accurately answered. Food handlers with a score between 0–5 were considered to have poor nutritional knowledge, those with a score ranging from 6–10 were considered to have average nutritional knowledge and those with scores of 11–15 were deemed to have good nutrition knowledge. The attitudes assessment section consisted of 2 Likert-scale questions.

2.4. Data analysis

The data from the questionnaires was captured electronically by the researcher using Microsoft Excel. Further analyses were performed by a statistician using SAS Version 9.2. Descriptive statistics, namely frequencies and percentages, were calculated for categorical data whilst means and standard deviations or medians and percentiles were calculated for numerical data. Correlation analysis was used to investigate the relationship between variables. Analytical statistics, namely the Shapiro-Wilk test, was used to test for normality, the independent T-test or ANOVA was used to test the mean differences among groups, and the Wilcoxon Two-Sample test Mann-Whitney U-test or Kruskal-Walli test was used to test for median differences among groups. A significance level (α) of 0.05 was applied.

3. Results

The study was designed to assess the nutrition knowledge and attitudes of street food vendors in Mangaung Metro Municipality. Questionnaires were administered to 100 food vendors (in the time period between June–August 2022) with more females (57%) than males (43%) in the sample. This is common in most studies conducted among street food vendors[12–14]. The predominance of female food handlers in African countries is not surprising considering that in African households, women are commonly, from a young age, involved in preparation and serving of food. However, as a result of modernization and high unemployment rates, more men are seen to get involved in culinary practices[15]. Most vendors in this study were South African (54%), Black Africans (81%), married (28%) and had some high school education (37%). Vendors from other countries constituted 46% of the participants and most vendors fell within the age range of 25–44 (59%). According to the by-laws governing street trade in Mangaung, foreign nationals are permitted to work in this trade with the provision that they hold an original copy of their asylum documents or a temporary residence permit issued by the Department of Home Affairs. The by-laws further state that persons below the age of 18 are not permitted to engage in street trade[16]. Interestingly, in this study, one female participant who was an employee of one of the stall owners indicated that she was below 18 years of age. This sheds light on the challenges of enforcing laws relating to street vending, and further the dire economic challenges faced by the South African youth.

As depicted in **Table 1** above, most vendors worked over 8 h shifts (88%) and most from Monday to Saturday (85%). According to the South African Labour Guide[17], employees earning below the earnings threshold (R18 673.37 per month) should work a maximum of 9 h/day (excluding lunch hour) for a 5 day work week and 8 h per day for those working for more than 5 days/week. Although most vendors in this study are self-employed, when compared to the minimum conditions set for employees in South Africa, they are still well below the standard. Most of the vendors in this study (71%) said they made between R 501.00–R 3000.00 per week, implying that they earn significantly below the earnings threshold and yet work longer hours. Only 40% of the participants in this study indicated that they had access to hand washing facilities and 11% had access to clean water onsite. The rest of the vendors had to fetch water using buckets and containers. In their study, Young et al.[18] argue that water security—a term used to refer to a myriad of water challenges—is essential in ensuring food security, good nutrition and well-being. Moreover, the relationship between clean water and hygiene and sanitation has extensively been explored. Many international organizations show that access to clean water and good hygiene facilities significantly protect against diarrheal disease and many others[19–21].

Table 1. Operational characteristics of food vendors in MMM (*n* = 100).

Operational characteristic	Number (N)	Percentage (%)
Days worked/week		
Monday–Friday	100	100
Monday–Saturday	85	85
Monday–Sunday	15	15
Hours worked/day		
≤8	12	12
>8	88	88
Stall ownership		
Owner	83	83
Joint owner	3	3
Non-owner	14	14
Average weekly income		
≤500	14	14
501–1000	35	35
1001–2000	36	36
2001–3000	11	11
3001–4000	4	4
4001–5000	0	0
>5000	0	0
Facilities available		
Water	11	11
Electricity	3	3
Gas	40	40
Stove	41	41
Fridge	2	2
Rubbish disposal	75	75
Hand washing facility	40	40

Table 2 reports on the food items sold by the vendors. Of the cooked food sold, pap (55.2%) was the predominantly sold food item. Pap (stiff porridge) is a South African staple food. It is energy dense and a good source of carbohydrates (79.47–85.2 g/100g)[22]. Other commonly sold cooked foods included sausages/wors (40.3%), grilled chicken/chicken stew (37.3%), chicken offals (28.4%), fat cakes (29.9%), French fries (26.7%) and grilled pork/pork stew (22.4%). Red meat in South Africa has increasingly become expensive during the year 2021. Consequently, red meat has somewhat become an undesirable product for street food vendors who are often looking to keep costs as low as possible. Although food sold by vendors is affordable and filling, it is often considered to be unhealthy because it normally contains high levels of trans fats, fats, saturated fats, salt and added sugar[23]. Street vended foods are considered by some studies to be precursors to non-communicable chronic illnesses as well as overweightness and obesity[4,12]. Taking into consideration that habitual, consumers of street vended foods are persons of low socioeconomic status, the health risks presented by their eating habits could prove more injurious to them[24].

Table 2. Food items sold by vendors in MMM.

Food item	***N***	**% of total food (*n* = 74)**	**% of food cooked by vendors (*n* = 28)**
Beans	3	2.4	4.5
Grilled beef and beef stew	6	4.8	9.0
Beef offals	8	6.3	11.9
Boiled eggs	3	2.4	4.5
Bread	11	8.7	16.4
Cabbage stir-fry	5	4.0	7.5
Grilled chicken/chicken stew	25	19.8	37.3
Chicken offals	19	15.1	28.4
Fat cakes	20	15.9	29.9
Fish	6	4.8	9.0
French fries	18	14.3	26.8
Ginger drink	7	5.6	10.4
Gravy	2	1.6	3.0
Kale	12	9.5	17.9
Kota	8	6.3	11.9
Mince meat	5	4.0	7.5
Muffins	5	4.0	7.5
Mutton	1	0.8	1.5
Nyekoe	1	0.8	1.5
Pap/porridge	37	29.3	55.2
Grilled pork/pork stew	15	11.9	22.4
Rice	3	2.4	4.5
Salads	3	2.4	4.5
Sandwiches	2	1.6	3.0
Sausages/wors	27	21.4	40.3
Sheep trotters and offals	12	9.5	17.9
Tea	6	4.8	9.0
Scones	12	9.5	17.9

Fruits	83	65.9
Vegetables	65	51.6
Atchar	1	0.8
Biscuits	9	7.1
Store bought bread	2	1.6
Candy	16	12.7
Chillies	4	3.2
Cooking oil	1	0.8
Corn chips	10	7.9
Energy drinks	3	2.4
Fizzy drinks	18	14.3
Ginger drink	2	1.6
Bubble gum	9	7.1
Milk	1	0.8
Salt	1	0.8
Soup sachets	1	0.
Spices	1	0.8
Sugar	1	0.8
Tea bags	1	0.8
Water	2	1.6

3.1. Nutrition knowledge of vendors

The nutrition knowledge of vendors and its relationship to demographic characteristics are demonstrated in **Tables 3** and **4** below. In this study, the nutrition knowledge responses given by vendors are indicative of a satisfactory knowledge level. None of the participants scored below 33% (i.e., ≤5/15). Above 75% of the vendors correctly responded to questions relating to fats and over 90% responded correctly to questions relating to fiber. Because fiber as a dietary component plays a significant role in immune regulation, maintaining bowel health and weight management among other health benefits, it is highly recommended that people consume diets highly comprised of vegetables, fruits, and whole grain cereals[25]. About 92% of the vendors had knowledge of the health effects of high salt intake. However, fewer respondents (53%) could tell which food seasoning had lesser salt content. As a result of this, food handlers are likely to involuntarily prepare high salt containing foods. In an effort to reduce salt intake among South African consumers, the South African health ministry enacted legislation in 2013 which mandates salt reduction in the food production industry[26]. Through public health campaigns and food regulations, the mean population intake of salt was meant to be reduced from 8–10 g per day in 2011 to 5 g per day by 2020. This new recommendation coincides with the daily recommended intake of 5 g per day per person by the World Health Organization[27]. Street food handlers can have an important role to play in minimizing salt intake by consumers if food safety training is offered and it includes the aspect of relevant legislation.

Table 3. Nutrition knowledge questions answered correctly by vendors (*n* = 100).

	Question	**Correct answer %**
1	Which vegetable will help with good eye sight? Butternut, cabbage, lettuce, cucumber	10
2	Which fruit will help the body fight colds?	89

	Apple, mango, nartjie, peach	
3	Which vegetable has the most fiber (roughage)? Cabbage, cauliflower, green beans, lettuce	47
4	Which type of potatoes have the least fat? Mashed potatoes, fried potatoes, boiled potatoes, roasted potatoes	77
5	Which food normally has the most fat? Atjar, mayonnaise, mustard, chakalaka	87
6	Why are starchy food important to eat? They are easy to digest, they build muscle, they are a source of energy, they fight disease	70
7	When will starchy foods make one gain weight? When eaten with meat, when eaten in large amounts, when eaten in the mornings, when eaten with vegetables	55
8	How often should oily fish like pilchards and tuna at least be eaten? Every day, once a week, twice a week, twice a month	32
9	Which food is better for a healthy heart? Fried chicken, grilled fish, roast beef, boiled sheep brains	28
10	Which food has more fiber (roughage)? Eggs, nuts, fish, chicken	96
11	Why can legumes like dried beans and lentils be eaten instead of meat? They have protein, they have vitamins, they have fat, they have fiber	84
12	Which food does not have added sugar? Canned apricots, apricot jam, apricot juice, fresh apricots	95
13	Which health problem can be caused by drinking sugary cool drinks every day? Heart disease, TB, liver disease, weight gain	60
14	Which health problem can one get from consuming too much salt? High blood pressure, liver failure, lung disease, high blood sugar	92
15	Which has the least salt? Braai salt, stock cubes, soup powder, dry herbs	53

Table 4. Nutrition knowledge scores vs demographics of street food vendors (in tertiles).

			Nutrition knowledge	
			Score out of 15	
	Total	**0–5 low**	**6–10 average**	**11–15 good**
Demographics	***N***	***N* (%)**	***N* (%)**	***N* (%)**
Nationality				
South African	54	0	34 (54.84)	20 (52.63)
Non-South African	46	0	28 (45.16)	18 (47.37)
Race				
Black African	81	0	49 (79.03)	32 (84.21)
Coloured	4	0	3 (4.84)	1 (2.63)
Other	15	0	10 (16.13)	5 (13.16)
Gender				
Male	43	0	29 (46.77)	14 (36.84)
Female	57	0	33 (53.23)	24 (63.16)
Age group				
<18	1	0	1 (1.61)	0 (0)
18–24	16	0	11 (17.74)	5 (13.16)

25–34	36	0	23 (37.10)	13 (34.21)
35–44	23	0	12 (19.35)	11 28.95)
45–54	18	0	10 (16.13)	8 (21.05)
55–64	6	0	5(8.06)	1 (2.63)
Education				
Primary school	21	0	17 (27.42)	4 (10.53)
Some high school	37	0	22 (35.48)	15 (39.47)
Matric	24	0	13 (20.97)	11 (28.95)
Diploma	10	0	5 (8.06)	5 (13.16)
Degree	8	0	5 (8.06)	3 (7.89)

Shapiro-Wilk test: $p = 0.0133$, Wilcoxon two sample test: $p = 0.5912$, Spearman Correlation Coefficients: $p = 0.9379$, Kruskal-Wallis test: $p = 0.1187$.

Table 4 above indicates the relationships between the street food vendors' demographics and their knowledge of nutrition. According to Shapiro-Wilk test for normalcy, the distribution of the knowledge percentage does not follow a normal distribution ($p = 0.0133$); Mdn 10 (IQR = 11–9). In this study, gender, age and education level did not have any impact on the knowledge of vendors ($p = 0.5912$), ($p = 0.9379$) and ($p = 0.1197$) respectively.

3.2. Attitudes of vendors towards nutrition

The assessment of vendors' attitudes towards nutrition indicated that most of them had positive attitudes towards salt intake.The Heart and Stroke Foundation South Africa[27] warns that high salt intake could lead to cardiovascular diseases among other health problems. Therefore, it is of critical that food handlers be cautious of the amount of salt added to food[28]. As depicted in **Figure 1** below, 80% of the vendors strongly agreed that food can still taste good with just a little salt added, while 83% indicated that they do take caution of the amount of salt in food. In addition, vendors had positive attitudes towards the consumption fruits and vegetables. According to Amao[29], the consumption of fruits and vegetables daily is important because they are good sources of micronutrients and dietary fibres. In this study, the majority of the participants (92%), indicated that they strongly agree to the daily consumption of fruits and vegetables. Eighty two percent of the vendors also agreed that roughage is important in starchy foods.

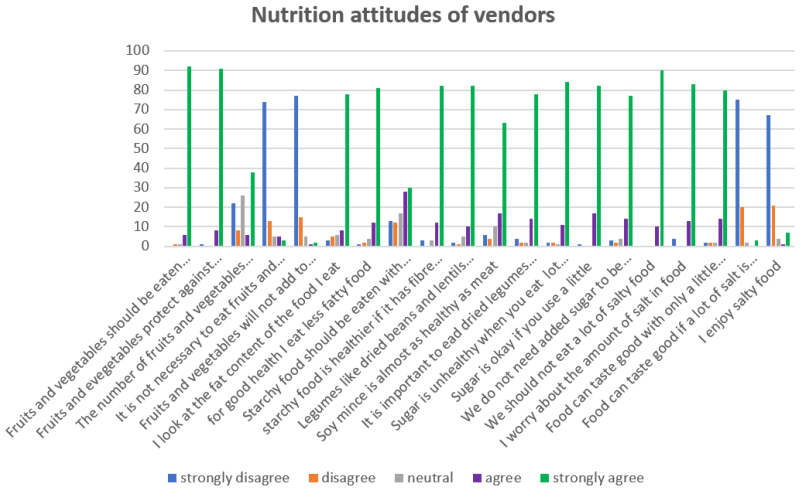

Figure 1. Nutrition attitudes of vendors.

4. Conclusions

A significant number of participants in this study were considered to be literate, which is often not the case for most street food vendors. However, as a result of the high unemployment rate in the region, street food vending as an informal form of employment which also requires very little capital serves as a source. Although vendors in MMM demonstrate some good knowledge and positive attitudes towards good nutrition, the food types and food portions they serve still present a challenge to the consumer's health. The vended foods are mostly energy-dense, high in salt, high in saturated fats and are mostly unbalanced meals. Taking into consideration the many benefits of street vended foods, which include cultural preservation and combating food insecurity, the idea of drastically changing the food menu or food preparation methods could threaten the profitability and in turn the livelihoods of the street food vendors. Therefore, better socio-economic interventions such as job creation, are necessary to alleviate the poverty level of both consumers and vendors in order to make them less reliant on street vended foods.

Author contributions

Conceptualization, PJL, JN and ZTN; methodology, PJL, JN and ZTN; validation, PJL, JN and ZTN formal analysis, PJL; investigation, PJL; resources, PJL; data curation, PJL ; writing—original draft preparation, PJL; writing—review and editing, PJL, JN and ZTN; visualization, PJL; supervision, JN and ZTN; project administration, PJL; funding acquisition, PJL, JN and ZTN . All authors have read and agreed to the published version of the manuscript.

Ethical statement

The study was approved by the Faculty Research Committee of the Central University of Technology on 2020-07-20.

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Conflict of interest

The authors declare no conflict of interest.

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