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KNOWLEDGE, SKILLS, AND HOUSEHOLD FOOD PREPARATION PRACTICES IN THE NORTH OF PRETORIA - GAUTENG PROVINCE, SOUTH AFRICA

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ABSTRACT

The food preparation method is one of the critical food security dimensions. Food may be available in a household. But still, the preparation method used for cooking food items may be detrimental to nutrient intake if the person responsible does not have appropriate cooking skills. Therefore, this study aims to assess the knowledge, skills, and household food preparation practices in the North of Tshwane, Gauteng Province to develop relevant intervention strategies to improve the community's cooking skills. A quantitative study design was used. Data was collected from 490 households using an interviewer-administered questionnaire. Descriptive statistics were analyzed using STATA 13.1. A Pearson chi-square was used to test for association between demographic variables, and the knowledge, skills, and household food preparation practices. Most households (64%) cook daily, 58% cook one main meal daily, 45% never eat food not prepared in a household, and 48% do not eat meals prepared away from home and do not opt to eat any meal out. Most households (51%) reported that they have food-cooking skills. Most households (65%) indicated that they use the boiling cooking method when cooking vegetables, 19% indicated that they use other methods, and 8% indicated that they use the frying method. There was an association between age, and how many main meals the households prepared at home (P-value = 0.013); age, and how often the households ate out (P-value = 0.026). An association was found between adults employed in a household, and how the household acquired cooking skills (P-value = 0.029); adults employed in a household and the cooking methods normally used by households when cooking meat (P-value = 0.050). Although most households indicated that they have cooking skills, there is a slight difference between them, and those who indicated that they don't, as most households indicated they use the boiling method for cooking vegetables. This denotes a cooking skills gap, which demands intervention. Also, cooking skills should be improved to reduce food wastage thus addressing household food security.

Key words: Food security, households, home-cooking, cooking skills, cooking practices

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INTRODUCTION

Food insecurity poses a huge challenge worldwide, with approximately 868 million people undernourished, and two billion people suffering from micronutrient deficiencies and negative health consequences [1]. Food security is food availability in the country, and the household's ability to access sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life [2]. Food may be available in a household but preparation methods used for cooking food may either improve or destroy the food item's nutritional content [3, 4]. For example, food items cooked using inappropriate methods may destroy nutrients during cooking. Subsequently, the food items consumed will no longer contain adequate nutrients necessary to maintain household's nutritional status [4]. Also, certain household members may not reap the full benefits if they do not receive sufficient food portions, or if their bodies cannot absorb the nutrients from the food due to poor food preparation. Therefore, households' food preparation knowledge, and skills are critical in facilitating dietary change [5]. Hence, more recurrent involvement in cooking activities is recommended during childhood to acquire better cooking skills [4].

Home food preparation is a basic life skill traditionally taught at home. It includes actions taken to transform food ingredients into meals, and their associated nourishment attributes using different cooking methods. Generally, it requires measurement, and ingredient combinations to achieve the desired results [6]. Food preparation skills are transferred from generation to generation and evolve during the first years of life when children learn by observing the family's eating and food preparation practices. The knowledge and skills inherited shape the food preparation methods utilized in adulthood. Hence cooking ability is positively associated with better nutritional indicators [7, 8].

How food is prepared influences the amount of food wasted and household food security [1, 9, 10]. Often, a lack of food preparation knowledge and skills leads to people using the wrong cooking methods, therefore destroying food items' nutrients. A study conducted in rural communities in KwaZulu Natal revealed that cooking methods such as, boiling vegetables were the most popular method used nonetheless; the liquid used for boiling was discarded after use. Also, caregivers preferred cooking methods such as; boiling, grilling, roasting, and stewing for preparing meat, poultry, fish, and eggs. The study also established that households acquired food and nutrition knowledge from different sources, with less dependency on inherent information sources [11].

Food preparation methods are associated with various benefits including; eating smaller portions, and consuming fewer calories which minimise food insecurity, and

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reduce the risk of individuals developing lifestyle non-communicable diseases such as obesity, hypertension, cancer, and diabetes [12]. Also, dietary household behaviour change can be based on a task's progression including food preparation and consumption. Given this progression, food preparation skills are critical components in facilitating dietary change. Consequently, the household's nutritional, health, and food security status can be improved [12]. A study conducted in Tshwane among white adults found that they follow a typical Western eating pattern consisting of three meals daily. Most of them eat all their meals at home, and consistently eat breakfast daily, with some participants consuming fewer legumes, fruit, and vegetables [13]. However, it is unclear if the meals consumed were prepared in a household.

There is a gradual change in food preparation observed among South Africans from traditional food preparation which involves using fresh produce, and conventional, local, cultural, and Indigenous food preparation methods which foster cooking with limited saturated fat, sugar, salt, and unrefined fibre ingredients to more Western foods due to urbanization, living standards, education levels, and reduced time available for cooking; this resulted in people consuming high-saturated fat, sugar, over-refined and lower fibre foods [14]. Concurrently, there is an evolving generation with little food knowledge, and inappropriate food preparation skills. Despite the growing awareness of the importance of food literacy, food illiteracy remains a global issue, affecting people of all ages, backgrounds, and socio-economic status [15]. Also, due to the increased number of employed women, mothers don't have time to teach cooking skills to the next generations as domestic workers may have taken over the cooking responsibility in the household [7]. Hence, domestic workers may not always have time to prepare food using adequate cooking methods to cook traditional items such as "isombe" from cassava leaves because it is very time-intensive [16]. Also, domestic workers may not have enough time to engage children as they have additional household chores besides food preparation. Yet, future generations need to engage in food preparation to acquire traditional cooking skills [7]. Ignored, traditional food preparation methods may disappear and be replaced by westernised cooking methods in the future.

Globally, there is a scarcity of literature focusing on household meal preparation. Available research focuses on energy type, and usage during food preparation, and how different food preparation methods affect the nutritional content of various foods. Also, the factors influencing people's food choices, and how their preparation skills shape them, are still not fully understood. Even though there are increasing numbers in obesity prevalence, and increased overweight, and obesity risk, there is limited research on home food skills, and preparation practices. Food preparation interventions for households are not available. This study provides information to

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assist in developing nutrition intervention programs to improve food preparation knowledge and household skills. Subsequently, overweight and obesity may be reduced at the community level. Therefore, this manuscript aims to determine the knowledge, skills, and household food preparation practices in the North of Pretoria, Gauteng Province.

MATERIALS AND METHODS

Study Approach and Design

This study used a quantitative descriptive approach to describe the knowledge, skills, and household food preparation practices in the northwest of Pretoria Gauteng province.

Study setting, population, sampling strategy, and sample size

The study area is a large underserviced township 34km northwest of Tshwane, about 10 km from the border industry area of Rosslyn, and identified as an urban core that provides housing for the local inhabitants and their families. In 2011, there were 90,177 Black Africans, 306 Coloureds, 125 Indian/Asian, and 249 other ethnic groups living in the area. The study area was designed as labour reserves for the manufacturing hub of Rosslyn and the city.

There were 7700 households from the 11 zones in the area in the Tshwane North in 2019. The online Raosoft sample size calculator with a 5% margin error, 95% confidence level, and 50% response distribution was used to select 490 households [17]. Proportionate sampling was used to select households from each zone. A household list was obtained from the area Municipality offices. Probability sampling was used to select households from a household list. Using random sampling, 366 households were selected. A 124-buffer sample was added to cover households who were unwilling to participate in the study, and who were not available on the data collection days.

Data Collection

Data was collected from 490 households using a pretested and validated structured questionnaire adapted from a previous study [18]. Three research assistants were trained on the questionnaire contents, and interviewing techniques. The research assistants followed the sampling procedure by visiting every fifth house, and interviewing the individual responsible for food preparation in the household (food handler). After the interview, the questionnaires were checked for completeness.

Reliability

A pilot study was conducted to pre-test the questionnaire. Gaps, flaws, and inconsistencies in the questionnaire were corrected. The study methods were

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applied consistently, and the procedures were standardised by conducting research assistant training before the data collection commenced.

Validity

The questionnaire was designed by adapting existing questions from a validated, and reliable questionnaire used in prior research about food preparation practices [18].

Data analysis

Data were coded and captured onto a Microsoft Excel spreadsheet, and statistical analysis was performed using STATA version 13 (StataCorp, LLC, College Station, TX, USA), a statistical package for data analysis. Descriptive statistics were performed for frequencies, mean, and standard deviation. The relationship between categorical variables was tested using a Pearson chi-square test, and a p-value less than 0.05 was considered statistically significant.

Ethical considerations

All participants gave informed consent before participating in the study. The study was conducted according to the Declaration of Helsinki and the protocol was approved by the Sefako Makgatho Research Ethics Committee (SMUREC/H/263/2016: IR).

RESULTS AND DISCUSSION

Socio-demographic characteristics of households

There were females (70%) and (30%) males responsible for cooking in a household that participated in this study. The majority (35%) of individuals responsible for cooking in households were between the ages of 35 and 55. Most households (39%) had one adult employed, while (64%) of household members had secondary education (Table 1).

Households' home cooking frequency

Table 2 indicates that most households (64%) cooked daily, and 29% cooked one to five times a week at home. The majority of households (58%) cook one main meal daily, and 30% cook two main meals daily.

In this study, 45% of households never ate food prepared away from home, and 30% ate food prepared away from home once a day. Most households (48%) did not eat meals prepared away from home, and 30% ate lunch meals prepared away from home (Table 2). Most households (48%) did not eat meals prepared away from home, and 30% ate lunch prepared away from home, most households in this study did not eat meals prepared away from home, and did not opt to eat any meal out (Table 2). Similarly, a study conducted in an urban area in Tshwane, South Africa showed that households eat all their meals at home, however, it was not indicated if the meals were cooked in a household. Also, a study conducted among urban

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Germans showed that most households cooked daily at home hence, they did not cook meals from scratch but used convenience foods, and complete meals from ready-made ingredients [19]. Home-cooked meals are associated with improved diet quality [5]. However, most caregivers in a study conducted in South Africa did not believe that consuming a healthy diet is influenced by knowledge of the various healthy food items, and preparing the food items using nutrient-retaining cooking [20]. These results denote that, even though households eat home-cooked meals daily there is no assurance that appropriate cooking methods were used, and the meals still have the necessary nutrients. Hence, understanding the association between cooking meals at home, and overall diet quality is important to recognise the potential positive impact home cooking has on diet quality, and in addressing diet-related diseases. Most adult households in the United States of America said they eat out at restaurants once a week or more, and only a few said they never eat out at restaurants [21].

Household's Food Items cooking skills

Table 3, shows that most households (51%) have cooking skills and the remaining respondents (49%) said they don't have food cookery skills. 72% of households indicated that they acquired cooking skills from family members, and 16% said they acquired skills from attending short cooking courses. Similarly, in a study conducted in the Northern Republic of Ireland, children had confidence in their cooking skills, cooking practices, and cooking attitudes and acquired the cooking skills from their mothers [7]. Differently, a study conducted among children and adolescents in Switzerland showed that households acquired food and nutrition knowledge from different sources, with less reliance on inherent sources of information [22].

In this study, 51% households said they always use spices when cooking, and 12% said that they never use spices when cooking. Equally, cooking with spices and herbs can make your food flavourful and healthier. Aromatic plant materials have been used in food preparation, and preservation for years. However, the educational level and possession of cooking, and culinary qualifications did not influence household spice usage [23]. Accordingly, most urban households use unroasted spices especially red chili powder when cooking [24].

Most households (82%) start cooking from scratch, and 6% never cook from scratch. Contrarily, in developed countries, more than half of a household's dietary energy is attributed to Ultra Processed Food (UPF). This may be because UPF foods are quicker and easier to prepare, and the change in women's roles from unemployed to employed results in less time dedicated to home food preparation, and it is convenient to use UPF to prepare dinner for families [25]. However, it should be noted that the socio-economic conditions of developed countries are not the same as conditions experienced in South Africa, a developing country. Due to a lack of

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South African studies on household food preparation, studies from other countries have been included. Factors influencing cooking from scratch include time pressure; the desire for effortless meals; the ability to plan and prepare meals ahead of time; and more self-assurance in one's cooking skills [7].

Most households (65%) in this study use the boiling cooking method when cooking vegetables, and 8% use the frying method to cook vegetables. Boiling entails immersing a food item in heated water, and the water serves as the cooking medium [3]. Frying refers to cooking food in oil, which is heated, and the oil serves as the cooking medium [4]. The most appropriate vegetable preparation method is steaming as it retains texture, colour, and nutrients.

When cooking meat, 35% use more than one cooking method, 14% use frying, and 12% use the stewing method. Equally, in a study conducted in KwaZulu-Natal South Africa, most households use the boiling method when cooking vegetables, and the liquid used for boiling is discarded after use [18]. Also, boiling was the most popular method for cooking vegetables. Likewise, households preferred cooking methods such as boiling, grilling, roasting, and stewing for meat, poultry, fish, and egg preparation [18]. Therefore, specific educational interventions are warranted in improving households' food preparation skills. This will enable them to apply appropriate cooking methods to ensure the retention of nutrients during food preparation, and to minimise food waste thus improving household food security. Also, knowledge and food preparation skills allow for a broader food items variety preparation, enabling households to incorporate the vital foods for a healthy diet and broaden their food selection [26].

When asked about the food item they enjoy cooking, 30% of households said they enjoy cooking vegetables, 30% enjoy cooking meat, and 23% enjoy cooking starch (Table 3). Nevertheless, most households wanted to learn to cook various evening meals, especially ethnic dishes. Most preferred to learn from television [8]. Hence, those who learned cooking skills from their mothers had confidence in their cooking skills [7].

The ability to plan meals and the greater efficacy of one's cooking skills influence a household's ability to transform raw foods into edible meals [7]. Therefore, households need to have the necessary knowledge, and skills to prepare meals from scratch, and sufficient time for all the activities involved in food preparation. This knowledge may be utilized to choose the correct preparation methods when cooking to ensure nutrient retention after cooking food [4, 7].

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Household food preparation practices

In this study, 46% of households sometimes prepare nutritionally adequate meals from available groceries, and 20% never prepare nutritionally adequate food using the available groceries.

Most households (45%) are sometimes able to use leftover food to create a nutritious meal, and 33% of households never use leftover food to create a nutritious meal.

Most households (70%) reported that it is important to have cooking skills while 30% don't think that it is important to have cooking skills, (Table 4). However, studies show mixed results regarding the use of leftovers by households. In Australia, most plated but not eaten foods are prepared but un-plated leftover foods are thrown away by households [27]. Similarly, In the United States of America, most plated leftover foods are squandered yearly, making plate wastage a big contributor to the country's food waste stream. Households view eating leftovers as a trade-off or compromise for family meals [28, 29]; households are not using leftovers due to perceived demand among household members for tried and tested recipes rather than new recipes required to use leftovers [29]. In addition, leftover refrigerator food storage was perceived as a guilt delay ploy and poor storage tactics leading to rotting and waste in household refrigerators [27]. Household food wastage is influenced by household shopping practices, food preparation methods utilised, and household leftover food management practices. Consequently, respondents who frequently use leftover foods report lower levels of wasted food [31]. Respectively, respondents suggest that leftover food is safe, but it is difficult to use leftovers to create new meals [32].

Leftovers are the main avoidable household food waste [27], nonetheless, they are less likely to be fully consumed than non-leftover food items, and larger meals lead to more wasted food [29].

Reducing household food waste is a policy goal of numerous national governments including South Africa; and the United Nations through its Sustainable Development Goals [33]. Food waste reduction goals improve household food security by planning, preparing, and consuming all the food provided. Subsequently, all the nutrients and calories that would be discarded will be consumed. Food leftovers are core to focus on mitigating food waste. This suggests that strategies to reduce meal size may be most effective in reducing food waste by limiting the creation of leftovers in the first place.

Association between categorical variables

There was an association between age, and how many main meals the households prepare at home at P-value = 0.013; age and how many times the households eat out at P-value = 0.026; between age and the meals which households normally eat

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out at P-value = 0.013; age and how the households acquired cooking skills at P-value = 0.016; age and the cooking methods households use when cooking vegetables at P-value = 0.000; Age and the food items the households enjoy cooking at P-value = 0.009.

The current study shows that age influences the frequency of home main meal preparation, the frequency of times the households eat out, the meals households normally eat out, how the households acquired cooking skills, cooking methods used when cooking vegetables, and food items households enjoy cooking. Similarly, in a study by Newman *et al.* [34], participant's age influenced the frequency of home cooking, and more family meals were observed in households where the reference person was ≥65. In addition, eating home-cooked meals more frequently is associated with being older [8]. This may be because when people become older, it becomes important to take care of their health to live a long and healthy life. Therefore, preparing their food allows them to control the ingredients and to eat healthy, and can help increase appetite in older adults [8]. Furthermore, cooking is inexpensive than eating at restaurants, fast food joints, and school cafeterias. Moreover, households can control their menus and pick the food they want at every meal. Preparing meals from scratch ensures diet nutrition, and increased energy and health quality.

Similarly, in a study by Nsamba *et al.* [35] in rural Uganda, age, and food preparation skills influence the home cooking frequency and precooked food item consumption. Additionally, individuals who spend the minimum time on food preparation are working adults who highly prioritise convenience [35]. These households' food preparation practices and behaviour changes are ascribed to urbanisation, living standards, and households' educational level [14].

Furthermore, adults employed in a household influenced how the household acquired cooking skills, and the cooking methods normally used by households when cooking meat. Moreover, the educational level influenced the household's cooking skills, whether the households start cooking from scratch, the cooking methods normally used when cooking vegetables, and the methods households use when cooking meals. Age, employment status, and educational status influence eating out more frequently [37].

There was an association between adults employed in a household, and how the household acquired cooking skills at P-value = 0.029; adults employed in a household, and the cooking methods normally used by households when cooking meat at P-value = 0.050.

There was an association between educational level and household's cooking skills at P-value = 0.022; educational level and whether the households start cooking from

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scratch P-value = 0.045; educational level and the cooking methods used when cooking vegetables at P-value = 0.001; educational level and the methods used by households when cooking meals at P-value = 0.023.

A low level of caregiver cooking skills and knowledge of healthy cooking methods, and food items was associated with infrequent home cooking [8, 38]. Educational level and household income influenced frequent takeaway consumption [39]. Similarly, traditional cooking methods were associated with rural life, while the rapid technological changes in urban areas drove people to new eating behaviours and food preparation practices [15]. Also, the increased number of educated and working women is a constraint as they cannot participate in time-intensive food preparation [15, 40].

LIMITATIONS

The findings of this study are only limited to the area, the study area representation, and cannot be generalised to the Gauteng province or the whole country.

CONCLUSION AND RECOMMENDATIONS FOR DEVELOPMENT

Food may be available at the household level, but the lack of knowledge and food preparation skills may destroy nutrients in food. The findings of this study showed that most households have food cooking skills, however, there is a slight difference between those households who have skills and households who do not have cooking skills. Also, most households indicated that they use the boiling cooking method when cooking vegetables, which denotes that they lack the knowledge and cooking skills to prepare different food items. Also, some participants consume fewer legumes, fruit, and vegetables. A lack of cooking skills and degraded food preparation knowledge are considerable barriers to preparing home-cooked meals. Hence, households often opt for convenience foods, takeaways, frozen, pre-packaged foods, and eating out at restaurants rather than preparing and cooking meals. Consequently, households with low levels of culinary self-efficacy and self-worth in using fruits, vegetables, and appropriate seasonings may put their families at risk of being overweight and obese as eating out is associated with higher chances of being overweight and obesity.

Considering the findings of this study, there is a need to develop strategies focused on ensuring that households maintain the practice of cooking meals from scratch. Also, improving cooking skills is a probable intervention goal to promote better health and household diet outcomes.

The purpose of the study was to identify knowledge, skills, and food preparation practices in households, and to develop strategies based on the preparation and cooking of food items accessible and available in the households. The researchers

recommend that food preparation intervention strategies such as cooking programs be developed for confidence, and positive attitudes toward home food preparation. The cooking programs must be introduced and implemented at the community level, to build on food items readily accessible and available at the household level. The researchers encourage families to be involved in cooking programs to produce and transfer skills to the home environment. The cooking programmes may be extended to other areas in the province as per need.

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Table 1: Households' characteristics

Households Characteristics	N	%
18-34 years	137	28
35-55 years	173	35
56-64 tears	60	12
65+	121	25
Gender		
Males	142	30
Females	349	70
Adults employed		
No adult employed	188	38
One adult employed	192	39
Two adults employed	77	15
Three adults employed	28	6
Four adults employed	4	1
Five adults employed	2	1
Education level		
No Primary education	8	2
Primary education	86	18
Secondary education	314	63
Tertiary education	83	17

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Table 2: Household frequency of home cooking

Variables	**n**	**%**
How many times do you cook per week?		
Everyday	312	64
Once to five times a week	140	29
Only on weekends	12	2
Other	27	5
How many main meals do you prepare for your family per day?		
Three meals per day	59	12
Two meals per day	147	30
One meal per day	285	58
How many times do you eat out per week?		
Everyday	32	7
Once a day	148	30
More than once	91	19
Never	220	44
Options of meals eaten out		
Breakfast	21	4
Lunch	148	30
Supper	86	18
None	236	48

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Table 3: Household Cooking Skills

Variables	N	%
Do you have any skills in cooking food?		
Yes	248	51
No	243	49
How did you acquire cooking skills?		
Short course attendance	79	16
Education	27	6
Cooking classes at school	32	7
From family members	353	71
Do you normally use spices when cooking?		
Always	249	51
Sometimes	184	37
Never	58	12
Do you start cooking from scratch?		
Always	402	82
Sometimes	60	12
Never	29	6
Which cooking method do you normally use when cooking vegetables?		
Boiling	319	65
Frying	40	8
Casseroling	4	1
Stewing	26	5
Braising	7	1
Others	95	20
Which cooking method do you normally use when cooking meat?		
Braising	18	4
Boiling	139	28
Grilling	57	12
Stewing	36	7
Frying	71	14
More than one method	170	35
The food item do you enjoy cooking?		
Vegetables	148	30
Meat	147	30
starch	113	23
Vegetables and meat	25	5
Vegetables and starch	4	1
Meat and starch	11	2
Vegetables, meat and starch	43	9

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Table 4: Household's food preparation practices

Variables	N	%
Are you able to prepare nutritionally adequate meals from available groceries?		
Always	166	34
Sometimes	226	46
Never	99	20
Are you able to use leftover food to create a nutritious meal?		
Always	108	22
Sometimes	221	45
Never	162	33
Do you think it is important to have cooking skills?		
Yes	345	70
No	146	30

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