



Article Exploring the Food (In)Security Status of Suburban Households and Its Determinants during COVID-19

Busisiwe Lujabe ^{1,*}, Blanche Pretorius ¹, Veonna Goliath ¹ and Wilbert Sibanda ²

- ¹ Department of Social Development Professions, Nelson Mandela University, Port Elizabeth 6200, South Africa; blanche.pretorius@mandela.ac.za (B.P.); veonna.goliath@mandela.ac.za (V.G.)
- ² Department of Biostatics Unit, Nelson Mandela University, Port Elizabeth 6200, South Africa; wilbert.sibanda@mandela.ac.za
- * Correspondence: busisiwe.lujabe@mandela.ac.za

Abstract: Household food insecurity in South African suburban low-income households is a major challenge. Research outcomes that will inform decisions on effective solutions towards reducing household food insecurity in South Africa are essential. The purpose of this study was firstly to determine the food security status of households and the skills of household members in Ward 60 of the Nelson Mandela Bay Municipality in the Eastern Cape Province in South Africa. Secondly, it was also to determine the association between the socioeconomic and demographic variables of the households and their level of food (in-)security. The study employed a mixed method of both qualitative and quantitative methodologies, comprising a qualitative Community-Based Participatory Action Research (CBPAR) methodology and a quantitative household food security survey methodology. A household food security survey was employed using a questionnaire that was based on the Household Food Insecurity Access Scale (HFIAS). The questionnaire was used to collect data from 170 randomly selected households. The data analysis used the HFIAS score and logistic regression analysis. The results show 6.1% of households as food secure, 3.05% as mildly food insecure, 13.4% as moderately food insecure, and 77.4% as severely food insecure. The results also show that a significant unemployment rate, a reliance on social grants, and absence of income seriously impact the extent of household food insecurity. The results show a significant association between the household food security and the variables of unemployment, income, and gender. The regression analysis results suggest that gender, household size, age, employment, and household income influence household food security. The results of the household skills show that the households had a variety of skills. These results can help to inform decisions by the government, local municipalities, NGOs, and other stakeholders towards designing effective solutions for enhancing household food security.

Keywords: household food (in)security; suburban households; socioeconomic determinants; COVID-19

1. Introduction

Food insecurity is a global challenge. The number of hungry people in the world is on an upward trajectory, having increased from 804 million in 2016 to almost 821 million in 2017 [1]. This number again rose by 10 million people from 2018 to 2019 [2]. In 2020, world hunger was exacerbated by the COVID-19 pandemic, and the number of hungry people rose up to about 118 million people. On the African continent, about 256 million Africans experienced hunger in 2019, which was nearly 20% of the population, and in 2020, this number increased by 46 million people. Of these, 239 million were in sub-Saharan Africa and 17 million were in Northern Africa [3]. As a consequence of the rise in the number of hungry people, the food insecurity situation appears to have worsened in parts of sub-Saharan Africa [3]. Of major concern is that, if this trend persists, the target of the Sustainable Development Goals (SDGs) for hunger eradication will not be achieved by 2030. This means that efforts to reduce food insecurity need to be enhanced.



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Even though South Africa is food secure by national standards, previous studies showed that South Africa has been experiencing major challenges of household food insecurity in low-income communities surrounding the cities (Battersby [4]; Cooke [5]; Crush and Tawodzera [6]; Rudolph, Kroll, Ruysenaar, and Dhlamini [7]; Grobler, [8]; Bikombo [9], StatsSA [10]). The findings of the General Household Survey [11] confirmed that almost 20% of South African households had inadequate or severely inadequate access to food in 2017. The results of the GHS [11] revealed that 1.6 million people experienced hunger and 13.4 million households had inadequate access or severely inadequate access to food in 2017, and 20.1% of these households were reported to be from the Eastern Cape Province, which is where the current study is located. Most recently published studies on food security [12,13]) showed that the socioeconomic impact of the COVID-19 pandemic has amplified the visibility of food insecurity. There is consensus among the most recent studies that the challenge of food insecurity facing low-income and poor suburban households appears to be on the rise. According to the findings of the General Household Survey [14], 20.6% of households in the nation considered their access to food as inadequate or severely inadequate. The findings also indicated an increased reliance on grants as the main source of income (20.4% in 2019 to 28.8% in 2020) and a slight decrease in salaries and wages (54.8% to 50.8%), as well as remittances (11.0% to 8.8%). The findings from Statistics South Africa's [15] Quarterly Labour Force Survey (QLFS) for the second quarter of 2020 (QLFS 2020 Q2) and from the National Income Dynamics Study's Coronavirus Rapid Mobile Survey [13], which was conducted to track and analyze the socioeconomic impact of COVID-19, concurred that a large number of suburban low-income households are food insecure due to unemployment and poverty. The findings from the first wave of the survey released in July 2020 showed that the impacts of the Alert Level 5 lockdown regulations of the Disaster Management Act (SA, 2020) on employment and earnings in South Africa indicated an 18% decline. The weighted NIDS-CRAM 2020 [13] Wave 1 data showed that the number of people who were employed in February 2020 declined by 3 million, from 17 million people to 14 million people, in April 2020. The findings from the second wave showed that, between April and June, wages among formal workers declined by 68%, while the decline for informal workers was 120%. Thus, it was recorded that wages for informal workers further declined by 52% compared to the decrease experienced among formal workers [12,13,15]. Importantly, 'vulnerable' groups from urban populations, particularly among employees in informal economies and the service sector (i.e., those at the lower end of the income distribution, workers with lower levels of education, etc.), have particularly lost their income sources due to COVID-19. Bashir and Schilizzi [16] asserted that 80% of income in poorer households is spent on purchasing food. Loss of income due to unemployment impacts purchasing power, which consequently impacts affordability and access to food. Chakona and Shackleton [17] confirmed that food security in urban and suburban areas is largely determined by household income.

Previous studies showed that there is a close association between the level of food (in)security of a household and its demographic and socioeconomic status (StatsSA [10]; Sekhampu [18]; Dunga and Dunga [19]; De Cock, D'Haese, Vink, Van Rooyen, Staelens, Schönfeldt, and D'Haese [20]; Olagunju, Babatunde, and Ajiboye [21], Zakari, Ying, and Song [22]; Nkomoki, Bavorova, and Banout [23]; Drysdale, Bob, and Moshabela [24]). The findings of a study in Zambia by Nkomoki, Bavorova, and Banout [23] revealed that higher education levels of a household head, increasing income, increasing land size, secure land tenure, and group membership increase the probability of household food and nutrition security, whilst findings from a Nigerian study by Zakari, Ying, and Song [22] revealed a negative and significant association between lack of money and food security. The findings of the GHS [11] showed that households that were likely to experience hunger and inadequate or severe access to food were those headed by females and those headed by black Africans, as well as households that were bigger in size and had a higher number of young children. There was consensus in the findings of a number of previous studies in that household income is the most important economic influencer of household food insecurity.

However, the studies differed in terms of which variables they found to be significantly associated with food insecurity. In some studies that dealt with the demographic and socioeconomic determinants of household food security, variables such as gender, age, education levels, employment and income levels, household size, and the number of children per household were significantly associated with food insecurity [18,24], whilst in some studies, demographic and socioeconomic variables such as race/ethnicity, gender, and education were not significantly associated with food insecurity [25]. Thus, the empirical hypothesis drawn from these studies is that the prevalence of household food insecurity in low-income suburban households is determined by key demographic and socioeconomic variables, such as gender, age, education levels, employment and income levels, household size, and the number of children per household. None of the studies explored the skills of households as an additional variable or the potential influence thereof on household food insecurity. Hence, the purpose of this study was firstly to determine the food security status of households and the skills of household members in Ward 60 of the Nelson Mandela Bay Municipality in the Eastern Cape Province in South Africa. Secondly, it was also to determine the association between the socioeconomic and demographic variables of the households and their level of food (in)security. This article thus reports on the findings on the food security status of households in Ward 60 of NMBM and on the association between the socioeconomic and demographic variables of the households and their level of food (in)security. The results of the study on the variables that can possibly enhance household food security will help inform decisions by policymakers in the government, local municipalities, and other stakeholders towards designing effective solutions for enhancing household food security.

2. Methodology

2.1. Description of the Study Area

The study was carried out in Ward 60 of Nelson Mandela Bay Metropolitan Municipality (NMBM) in the Eastern Cape Province, South Africa. The Eastern Cape is one of nine provinces in South Africa. The Nelson Mandela Bay Metropolitan Municipality (NMBM) is the largest municipality in the Eastern Cape Province (see Figure 1, below), and is situated in Gqeberha, previously known as Port Elizabeth. The NMBM consists of 60 wards. According to the Statistics South Africa General Household Survey (GHS) [26], the NMBM accounts for a total population of 1,239,463, or approximately 19% of the total population in Eastern Cape Province. The NMBM consisted of 356,065 households in 2019 [26]. The composition of households consisted of 328,828 formal households and 27,237 informal households [26]. In addition, the average number of people per household declined from 4.25 in 1996 to 3.55 in 2011, and remained at 3.55 in December 2019 [26]. According to the GHS [26], the NMBM is characterized by a young population, with the age group of 5 to 14 years dominating. In terms of education, 75.8% of learners aged 7 to 24 years in the NMBM attended an educational institution. A total of 0.8% of people 20 years and older in NMBM had no schooling compared to a metro average of 1.4% [26]. According to the Statistics SA General Households Survey, 21.6% of households in the NMBM listed state grants as their main source of income. In terms of basic services, during the 2017/2018 financial year, 100 percent of qualifying households earning less than ZAR 3200 per month had access to free basic services offered by the municipality through its Assistance to the Poor (ATTP) program [26]. As of June 2018, the value of free basic services provided was ZAR 614,218,196, benefitting 101,645 qualifying households [27]. From the socioeconomic context of the NMBM, it is evident that households in the NMBM are increasingly affected by socioeconomic constraints, such as poverty and unemployment [26].



Figure 1. Municipalities in the Eastern Cape Province. Available online: www.municipalities.co.za (Accessed on: 15 February 2022).

Ward 60 has a geographical area of 34.4 square kilometers. According to the latest census performed in 2011, the ward was registered as having a total population of 23,514 and had 7465 households. The researcher was aware that these figures probably increased since the last 2011 census. Ward 60 consists of Wells Estate and Bluewater Bay. Whereas Bluewater Bay is a suburban area, Wells Estate is a low-income human settlement area that was planned to accommodate informal settlement dwellers who were relocated from various areas in the city of Gqeberha (Port Elizabeth) in the year 2000. The choice for Ward 60 was motivated by the fact that the researcher's place of residence is also located in the suburban area of Ward 60. The area was also targeted because it is close to one of the industrial development zones of the NMBM situated closest to the new Port of Ngqura.

2.2. Research Design

A Community-Based Participatory Action Research (CBPAR) approach was employed as the optimal design for guiding the broader study consisting of the following phases: Phase 1: problem identification; Phase 2: designing solutions; Phase 3: implementation, monitoring, and evaluation. CBPAR is a qualitative-approach methodology that is popular in disciplines such as health, social work, education, agriculture, and community development, particularly with a focus on social change. The choice of the approach was motivated by the fact that it provides a methodology that guides and supports collaborations aimed at community interventions. According to the CBPAR approach, conducting a situational analysis is the first step of phase one, namely, problem identification. The researcher relocated to the Wells Estate community. Relocation afforded the researcher with the opportunity to be in close contact and to connect with the community in order to undertake the first step of conducting a situational analysis. The situational analysis involved observing and listening to the stories of residents in the Wells Estate community. The words "*many households go to sleep without food*" became the common expression of most residents. The situational analysis led to the following key questions: What is the current status of household food security in Ward 60? What is the association between the demographic and socioeconomic variables of a household and its level of food security? What capacities and skills do households have? A household survey design, which is a quantitative methodological approach, was chosen as an appropriate design for phase one of the broader study, with the purpose of exploring the current status of household food security in Wells Estate and determining the association between the socioeconomic and demographic variables of a household and its level of food security, as well as exploring the capacities and skills of household members. The reasons for choosing a household survey design were that, firstly, surveys were inexpensive to conduct in terms of time and cost. Secondly, the survey instrument used an already existing questionnaire that included existing scales used in previously published research, namely, a Household Food Insecurity Access Scale (HFIAS) that was developed by the USAID to measure food security. Previous studies (Deitchler, Ballard, Swindale, and Coates [28]; Mohammadi, Omdivar, and Houshiar-Rad [29]) showed that the HFIAS method produced accurate results for household food insecurity because of its internal consistency, criterion validity, and reliability. Despite all of its strengths and advantages, survey research is often tainted with systematic biases, such as non-response bias, sampling bias, and social desirability bias (Tadesse, Abate, and Zewdie [30]). Tadesse, Abate, and Zewdie [30] and Stratton [31] agreed that it is not feasible for respondents to answer questions in a completely unbiased manner. Hence, the researcher acknowledges that response bias in self-administered survey research may be inevitable. In order to reduce bias and enhance survey integrity, the following risk-mitigating actions were implemented: (i) A pilot study was first conducted to validate the survey questionnaire prior to administration to the study sample in order to limit social desirability bias; (ii) fieldworkers received rigorous training prior to the data collection process, and they, in turn, trained the heads of the households by explaining the instructions and answering questions related to the questionnaire in the local languages of participants. Fieldworkers were also trained to explain the purpose and objectives of the survey and to assure participants that their responses would be anonymous, meaning that their personal information would be protected.

This article is based on the first phase of the study, namely, problem identification. The purpose of this article is to present the household food security status and the skill audit results of household members in Ward 60 of the Nelson Mandela Bay Municipality (NMBM), as well as to describe the association between the demographic and socioeconomic variables of the households and their level of food (in)security during the COVID-19 pandemic.

2.3. Target Population and Sampling Procedures

The study was carried out in the township of Wells Estate in Ward 60 of the Nelson Mandela Bay Municipality (NMBM) in the Eastern Cape Province, and the target population included all of the households residing in Wells Estate. The respondents were the heads of the households or any available adult aged 21 and above. A method of the use of random sampling was employed to obtain a sample size that would supply statistically reliable results and be representative of the population of the area [32]. Kotler, Shalowitz, and Stevens [33] argued that the minimum sample size for a random sample, based on the rule of thumb method, is 200. Thus, a sample size of 225 households was chosen as fairly above the minimum sample size. A total sample size of 225 households was targeted for the household survey, which was about 3% of the target population in terms of the 2011 census figures, but for reasons beyond the researcher's control, only 170 households, which was about 2.3% of the target population, participated in the household survey. Some of the reasons were that some households did not consent to participate in the study, some did not return the questionnaires, and some questionnaires were spoiled because participants could not adhere to the instructions. Before a sample could be drawn from a population, it was necessary to have available a 'sampling frame', that is, a mechanism that identified and located the sampling units within the population [34]. In this case, a household map of Ward 60 of Wells Estate was used as an area sampling frame containing

existing households and their stand numbers as the sampling units within the population. When choosing a sample, a starting point was randomly selected from the map of Ward 60 by randomly pointing at the map with a finger with the eyes closed. Whichever number the finger touched became the number to start with. A specific direction in which to read was chosen (whether up to down, left to right, or right to left). The use of random numbers involved the numbering of households from 1 to *N*, where *N* represented the sample size [35]. To avoid sampling bias, the researcher was an observer and was not involved in the sampling process.

2.4. Data Collection

Data collection proceeded from 25 September 2020 to 10 December 2020. It is important to note that whilst the study had been planned prior to the coronavirus pandemic, the data collection coincided with it. The study was conducted in accordance with the Belmont Report (1979), and the protocol received ethical approval from the institutional Research Ethics Committee (Human) [H20-HEA-SDP-005]. Before the commencement of the data collection process, a five-day training workshop was held with fieldworkers to (i) ensure their understanding and practice of all of the COVID-19 protocols, (ii) provide them with an understanding of the purpose and objectives of the research project, (iii) help them to understand their role in and contribution to the research project, (iv) equip them to understand the ethical considerations, such as confidentiality and voluntary participation, by keeping the identity of participants and the information received from them anonymous, as well as by explaining to participants that participation in the study was voluntary, (v) equip them to understand the data collection process and demonstrate a comprehensive and accurate understanding of each question in the data collection instrument, and, (vi) lastly, at the end of the training, the sample was randomly chosen from the map of Ward 60 so as to facilitate the delivery of the consent letters, consent forms, and questionnaires to the sampled households.

Initially, the fieldworkers distributed the consent forms to the randomly selected households to get consent from the household heads or representatives for participating in the study. The fieldworkers explained to the household heads or representatives the purpose of the study, including the ethical considerations around informed consent and confidentiality in relation to the identities of participants and the anonymity of their responses to the questions in the questionnaire. They also explained that participation in the study was voluntary and that there was no remuneration for participating in the study. The household survey questionnaires were subsequently delivered by trained fieldworkers to the sampled households of Ward 60 (Wells Estate) that consented to participate in the study. The fieldworkers went through the instructions of the questionnaire and the questions of the questionnaire with the household head or members to ensure that the household member had a clear understanding of the questions in the questionnaire and the response options. The fieldworkers read the questions with neutrality to reduce the possibility of socially desirable responses. Whilst doing so, the fieldworkers had to adhere to all the protocols of COVID-19, namely, (i) wearing of masks, (ii) sanitizing of hands, and (iii) social distancing. Participants were instructed to put all of their completed questionnaires in a marked, sealed box at the Council Office. The questionnaires were to remain anonymous; only a code was assigned for the purposes of data analysis. A pilot study was initially conducted with 12 households to test whether the household heads would respond appropriately to the questionnaire. Of the total determined sample size of 225, 170 households participated in the household survey.

The first section (section A) of the questionnaire included variables relating to the demographic and socioeconomic characteristics of households. The second section (section B) included a skill and capacity inventory. This set of questions related to identifying the skills of individual members of participating households. The third section (section C) of the questionnaire was drawn from the Household Food Insecurity Access Scale (HFIAS), which was developed and validated by USAID to measure food security. The HFIAS employs a series of 9 questions that detect the level of concern and availability, accessibility, variety, and/or quantity of food. Its aim is to assess whether households have experienced problems with accessing food over the last 30 days. The 9 questions, referred to as occurrence questions, require the respondent to provide either a 'yes' or 'no' (where no = 0 and yes = 1). The HFIAS highlights a household's concerns about the likelihood of food insecurity, including inadequate quality and inadequate amounts of food. A food-secure household is defined as one that is able to secure enough food to ensure adequate intake for all of its members [36]. All of the questionnaires were translated from English into the local languages of isiXhosa and Afrikaans, with all three languages included on each questionnaire. This would help participants to understand the questions according to their home or spoken languages in order to obviate misinterpretation and, thereby, remain as true to the original meaning of the question as possible.

2.5. Data Analysis

In this study, the quantitative data obtained from questionnaires for the household food security survey were analyzed by a statistician in two ways:

- (a) The Household Food Insecurity Access Scale (HFIAS) was used to indicate the degree of food insecurity (access) in the household in the past four weeks (30 days). The HFIAS score was calculated using the answers based on the nine frequency-ofoccurrence questions. For this study, the household head or member was asked if the condition presented in each question had ever occurred in the previous month. If the condition occurred, they were asked to indicate the frequency of occurrence, which included 'rarely', 'sometimes', or 'often'. Participants were then scored as follows: 'never', 'sometimes', or 'often', and they received a score of 1, 2, and 3 respectively.
- (b) Continuous variables, such as number of household members, were expressed as mean ± standard deviation or medians (interquartile range (IQR)) and compared using Student's *t*-test where appropriate. Categorical variables, such as employment status, were compared using Pearson's chi-square test or Fisher's exact test where appropriate. Chi-square tests were used to study associations between the demographic profile and food security status of households. A logistic regression model was used to establish the impact of socioeconomic and demographic variables on the food security status of households. Odds ratios (ORs) were used to compare the relative odds of the food security/insecurity given household age groups, male/female ratio, level of education, employment status, and income level.

All analyses were performed using SPSS version 27 (IBM 2019) and STATA version 16 (StataCorp. 2019). The level of significance was set at p < 0.05.

3. Results

The following findings highlight the reality of household food (in)security and the demographic characteristics of participants in Ward 60 (which is mostly Wells Estate). The following were the main findings.

3.1. Demographic Characteristics of Household Members

3.1.1. Age Groups

Table 1 indicates that the majority of households, 134 (39%), had members below the age of 18 years, and the total number of members below the age of 18 years was 282, making up 48% of the total number of members. Only 5% (n = 18) of the total number of households had members older than 60 years old.

	No. of Households	Total No. of Members
Age-group (years)		
<18	134 (39%)	282 (48%)
18–29	99 (29%)	160 (27%)
30–39	35 (10%)	50 (9%)
40-49	25 (7%)	31 (5%)
50–59	34 (10%)	42 (7%)
>60	18 (5%)	18 (3%)
Gender		
Male	151	316 (44%)
Female	157	401 (56%)
Employment		
Informal	43	53 (9%)
Formal	41	51 (9%)
Unemployed	140	412 (74%)
Self-employed	33	44 (8%)
		560
Income		
Self-Employed	28	37 (10%)
Salary	57	70 (19%)
Grant	136	251 (68%)
Stokvel	8	10 (3%)

Table 1. Demographic characteristics of household members.

3.1.2. Gender

As shown in Table 1, households with female members were in the majority (401 (56%)) compared to households with males (44%).

3.1.3. Employment

A large number of household members (412 (74%)) were unemployed. Only a small percentage (9% (n = 41)) were in formal employment, as shown in Table 1.

3.1.4. Income

Table 1 shows that most household members (n = 251 (68%)) relied on social grants as their source of income, and only 19% (n = 70) relied on salaries.

3.1.5. Education

In terms of education, a total of 150 households had household members with a level of education below matric, comprising 384 individuals, whereas only 10 households had members who were above matric, comprising 26 people.

3.1.6. Number of People per Household Based on Gender

Table 2 below shows that household with a largest number members (n = 304) of more than six people in a household had a larger number of females (n = 179 (59%)) than males (n = 125 (41%)).

Grouping Number of People in a Household	No. of Households	Total No. of Members	No. of Male Members	No. of Female Members
≤ 3	59	134 (100%)	65 (49%)	69 (51%)
4–5	63	279 (100%)	126 (45%)	153 (55%)
≥ 6	47	304 (100%)	125 (41%)	179 (59%)
Total	169	717 (100%)	316 (44%)	401 (56%)

Table 2. Distribution of household members in terms of gender.

3.2. Household Food Security

3.2.1. Responses to Food Security Questions

Table 3 and Figure 2 indicate the responses to the food security questions. According to the HFIAS, the questionnaires employed a series of 9 to 15 questions that detected the level of concern and availability, accessibility, variety, and/or quantity of food. Their aim was to assess whether households had experienced problems with accessing food over the previous 30 days. There were two sub-questions in the questionnaire. The first group of questions were the nine occurrence questions, and the respondent could reply with either 'yes' or 'no' (where no = 0 and yes = 1). The HFIAS highlights a household's concerns about the likelihood of food insecurity, which includes inadequate quality and inadequate amounts of food. A food-secure household is defined as one that is able to secure enough food to ensure adequate intake for all of its members.

Table 3. Responses to food security questions.

Variable	Number of Households n (%)	95% Confidence Interval	
FS1—Not Enough Food			
No	20 (11.8%)	7.8–17.5	
Yes	150 (88.2%)	82.5–92.3	
Total	170 (100%)		
FS2—Not Eating Preferred Food			
No	21 (12.4%)	8.2–18.2	
Yes	149 (87.6%)	81.9–91.8	
Total	170 (100%)		
FS3—Less Food on Plate			
No	28 (16.5%)	11.7–22.8	
Yes	142 (83.5%)	77.2-88.4	
Total	170 (100%)		
FS4—Did Not Want to Eat			
No	18 (10.6%)	6.8–16.1	
Yes	152 (89.4%)	83.9–93.2	
Total	170 (100%)		
FS5—Eating Smaller			
No	22 (13.02%)	8.76–18.92	
Yes	147 (86.5%)	8.11–9.1	
Missing	1		
Total	170 (100%)		
FS6—Eating Fewer			
No	27 (15.9%)	11.2–22.1	
Yes	143 (84.1%)	77.9–88.9	
Total	170 (100%)		

Variable	Number of Households n (%)	95% Confidence Interval
FS7—No Food		
No	49 (28.8%)	22.5–36.0
Yes	121 (71.2%)	63.96–77.46
Total	170 (100%)	
FS8—Sleeping Hungry		
No	68 (40%)	32.9–47.5
Yes	101 (59.4%)	51.9–66.5
Missing	1 (0.6%)	
Total	170 (100%)	
FS9—Day/Night No Eating		
No	85 (52.2%)	44.5–59.7
Yes	78 (45.9%)	40.3–55.5
Missing	7 (4.1%)	
Total		



Table 3. Cont.

Figure 2. Response to food security questions.

3.2.2. Investigation of the Relationship between the Demographic Characteristics of the Study Participants and Food Security

Table 4 indicates that there was a statistically significant association between the number of males in the household and the response to question FS1 related to not having enough food, with a *p*-value of 0.009. The study demonstrates that an increase in the number of male members in a household results in a decrease in the number of household members reporting not having enough food. An investigation of the odds ratios or likelihood of members of households having enough food indicated that the odds for males (\leq 4 in a household/>4 in a household) were 9.62 times (OR 9.628 (95% CI: 1.25–74.43) greater in households with >4 males compared to households with \leq 4 males. The observed OR was statistically significant. In other words, an increase in the number of males in a household resulted in an increased likelihood of responding "No" to the question "Do you have enough food?".

Table 4. Associations between the demographic characteristics of the study households and food security.

	FS1—Not Enough Food?		FS7—No Food?		FS8—Sleep Hungry?		FS9—Day/Night No Eating?		
Variable		No	Yes	No	Yes	No	Yes	No	Yes
Household Number	≤4 >4	13 7	82 68	30 19	65 56	39 29	55 46	52 33	40 38
<i>p</i> -value Chi-square		0.	382	0.3	372	0.7	710	0.20)3
No. of males in household	≤2 >2	18 1	86 46	33 11	71 36	42 17	61 30	58 19	42 25
<i>p</i> -value Chi-square		0.0)09 *	0.2	97	0.5	592	0.10)1
No. of females	≤2 >2	11 6	74 66	23 20	62 52	28 30	56 42	40 33	43 34
<i>p</i> -value Chi-square		0.	355	0.9	920	0.2	283	0.89	97
Informal employment	≤1 >1	4	32 7	8 2	28 5	13 3	23 4	18 4	18 1
<i>p</i> -value	~1	0.	354	2 0.7	716	0.7	735	0.20)7
Formal employment	≤ 1	6	25 10	12	19	12	19	15	14
<i>p</i> -value	>1	0.	132	÷ 0.9	942	0.3	ч 368	0.84	4 1
Unemployed	<u>≤</u> 1	1	27	4	24	4	24	11	15
<i>p</i> -value	>1	14 0.	98 172	34 0.0	78)87	53	59)1 *	58 0.27	49 76
Chi-square Income from	≤ 1	3	20	4	19	9	14	12	11
self-employment <i>p</i> -value	>1	0	10	2	8	3	7	3	5
Chi-square	~1	0.	17	0.0	16	0.0	12	11	
Income from salary	≤ 1 >1	3	8	4 1	16 7	2	13 6	2	9 4
<i>p</i> -value Chi-square		0.	246	0.6	640	0.6	509	0.35	52
Income from grant	≤1 >1	6 0	40 11	13 4	33 7	20 5	26 5	22 5	22 5
<i>p</i> -value Chi-square		0.	205	0.5	598	0.7	707	1.00	00
No Income	≤1 >1	15 4	49 68	24 16	40 56	28 31	35 41	36 33	25 36
<i>p</i> -value Chi-square	~ 1	0.0	003 *	0.0	51 *	0.8	371	0.20)2

* Represents Statistically significant associations.

Using a chi-squared test, a statistically significant association was observed between unemployment and the question FS8 ("Do you sleep hungry?"), with a *p*-value of 0.01. An increase in the number of unemployed members results in an increase in the number of

people reporting "sleeping hungry". The odds for replying "no" to the question "Do you sleep hungry?" were OR 0.20 (95% CI: 0.06–0.57). With an OR of 0.2, this means that there is an 80% decrease in the odds of responding "no", i.e., "sleeping hungry".

The study further indicated a statistically significant association between "no income" and the following food security questions: FS1 (not enough food) and FS7 (no food), with *p*-values of 0.03 and 0.051, respectively. This means that an increase in the number of household members with no income results in a corresponding increase in people with "not enough food" (FS1) and "no food at all" (FS7). Interestingly, an increase in the number of members on a social security grant results in a corresponding increase in the number of people who report "not having enough food" and "no food at all". This could be a result of the fact that, for an individual to be on a social security grant, one has to be unemployed and, in turn, social security grants themselves are meager sources of income that are perhaps not sufficient to meet the food needs of households.

Household Food Insecurity (Access) Scale Score

Here, the HFIAS score was considered to be a continuous measure depicting the degree of food insecurity (access) in a household in the past four weeks (30 days). The HFIAS score was calculated for each household by summing for the frequency of occurrence, as shown in Table 5. This means, therefore, that the higher the HFIAS score is, the more the food insecurity (access) the households experience, and the lower the score is, the less food insecurity they experience. An average HFIAS score was created for the entire group of households as follows:

Average HFIAS Score

$$= \frac{Sum \ of \ HFIAS \ Scores \ in \ the \ sample}{No. \ of \ HFIAS \ scores \ (i.e. \ households) in \ the \ sample} = \frac{2283}{170} = 13.4 \ \pm 6.9$$

Number of People in a Household	Frequency (n)	HFIAS Score (Mean \pm SD)
<u><3</u>	59	13.56 ± 6.37
4–5	63	12.89 ± 7.19
<u>≥6</u>	48	13.98 ± 7.14

Table 5. Average HFIAS scores based on the number of people in a household.

Household Food Insecurity (Access) Prevalence (HFIAP)

This was calculated to determine household food insecurity (access) prevalence. This indicator had four levels, namely, food secure, mildly insecure, moderately insecure, and severely insecure.

Food secure =
$$\frac{10}{164} \times 100 = 6.1\%$$

Mildly food insecure = $\frac{5}{164} \times 100 = 3.05\%$
Moderately insecure = $\frac{22}{164} \times 100 = 13.4\%$
Severely insecure = $\frac{127}{164} \times 100 = 77.4\%$

Domains Related to Household Insecurity (Access)

Here, three domains were investigated, namely, anxiety and uncertainty about household food supply, insufficient quality (including variety of and preferences for types of food), and insufficient food intake and its physical consequences, as shown in Table 6.

	Percentage of Households	Occurrence	Frequency of Occurrence (a's)
1	Households that worried about not having enough food in the past four weeks	150/170 = 88.2%	33/170 = 19.4%
2	Households with a household member(s) who was not able to eat the preferred kinds of food because of a lack of resources	149/170 = 87.6%	33/170 = 19.4%
3	Households with a household member(s) who had to eat a limited variety of foods due to a lack of resources	142/170 = 83.5%	30/170 = 17.6%
4	Households with a household member(s) who had to eat some foods they really did not want to eat due to a lack of resources to obtain other types of food	152/170 = 89.4%	33/170 = 19.4%
5	Households with a household member(s) who had to eat a smaller meal than they felt they needed because there was not enough food	147/169 = 86.98%	30/169 = 17.8%
6	Households with a household member(s) who had to eat fewer meals in a day because there was not enough food	143/170 = 84.1%	31/170 = 18.2%
7	Households in which there was never food to eat of any kind because of a lack of resources to get food	121/170 = 71.2%	24/170 = 14.1%
8	Households with a household member(s) who had gone to sleep at night hungry because there was not enough food	101/169 = 59.8%	12/169 = 7.1%
9	Households with a household member(s) who had gone a whole day and night without eating anything because there was not enough food	78/163 = 47.9%	12/163 = 7.4%

Table 6. Conditions related to household food insecurity (access).

The percentage of households with anxiety and uncertainty about household food supply was calculated as follows:

 $\frac{\textit{No. of households responding Yes (1) to Q1}}{\textit{Total No. of households responding to Q1}} \times 100$

$$Q1 = \frac{150}{170} \times 100 = 88.2\%$$

The percentage of households with insufficient food quality was calculated as follows:

 $\frac{\textit{No. of households responding Yes (1) to Q2, or Q3 or Q4}}{\textit{Total No. of households responding to Q2 or Q3 or Q4}} \times 100$

$$Q2 = \frac{149}{170} \times 100 = 87.6\%$$
$$Q3 = \frac{142}{170} \times 100 = 83.5\%$$
$$Q4 = \frac{152}{170} \times 100 = 89.4\%$$

The percentage of households with insufficient food intake was calculated as follows:

 $\frac{\text{No. of households responding Yes (1) to Q5, or Q6 or Q7 or Q8 or Q9}{\text{Total No. of households responding to Q5 or Q6 or Q7 or Q8 or Q9}} \times 100$

$$Q5 = \frac{147}{169} \times 100 = 87\%$$
$$Q6 = \frac{143}{170} \times 100 = 84.1\%$$

$$Q7 = \frac{121}{170} \times 100 = 71.2\%$$
$$Q8 = \frac{101}{169} \times 100 = 59.8\%$$
$$Q9 = \frac{78}{163} \times 100 = 47.9\%$$

3.3. Household Skill Inventory

The household survey questionnaire included a household skill inventory. Each household was expected to identify the skills of its household members by ticking them from a list of 40 skills. The results show that the household members had a variety of skills. The most common skills in most households were basic housekeeping skills, such as cleaning, cooking, baking, and laundry, followed by painting, gardening, fencing, and sewing. Sports and singing were also amongst the most selected skills. Other skills were hairstyling skills and computer and vocational skills, such as building, plastering, plumbing, carpentry, electrical work, welding, and tiling. The least common skills were creative skills, such as art, craftwork, pottery, knitting, and crocheting.

4. Discussion

From the results of the first phase of problem identification, it is evident that the majority of households in Wells Estate in Ward 60 are severely food insecure. Using the HFIAS measure, approximately 77.4% of households were categorized as severely food insecure, 13.4% as moderately food insecure, 3.05% as mildly food insecure, and 6.1% as food secure. These results confirm the findings of the most recent studies [14,15] about the challenge of food insecurity facing low-income and poor suburban households. Households with a household member(s) who had gone to sleep at night hungry because there was not enough food occurred in 60% of the households, and 88.2% of households reported experiencing anxiety and uncertainty about household food supply, whilst 89.4% of households were with insufficient food quality. In terms of the demographic variables of households, it was shown that the majority of households (134 (39%)) had members below the age of 18 years, and the total number of household members below the age of 18 years was 282, making up 48% of the total number of household members. The results show that the vast majority of the population in the study area consisted of young people, and only 5% of the total number of households had members older than 60 years old. With regards to gender, most households had a large number of females, consisting of 56% compared to only 44% for males. The findings also revealed that the majority of household members (74%) were unemployed and only 9% were in formal employment. In terms of income, most households (68%) relied on social security grants as their source of income, and very few, only 19%, relied on salaries. These results confirm the findings of the General Household Survey [26], which indicated that the NMBM is characterized by a young population and that the majority of households in the NMBM listed state grants as their main source of income. In terms of education, a total of 150 households had household members with a level of education below matric, comprising 384 individuals, whereas only 10 households had members who were above matric, comprising 26 people. These results are free of bias. As a means of controlling bias in this study, the researcher was not involved in the sampling, data collection, or data analysis. The HFIAS instrument that was used during the data collection process produces accurate results for household food insecurity because of its internal consistency, criterion validity, and reliability.

The results confirm findings of previous research in that household food security is largely dependent on a household's socioeconomic and demographic status [16]. The results show a clear correlation between household food security and a household's employment and income status. There is a significant unemployment rate (74%) that severely impacts the extent of household food security. There was a statistically significant association that was observed between unemployment and question FS8 ("Do you sleep hungry?"), with a

p-value of 0.01. The odds for replying "no" to the question "Do you sleep hungry?" were OR 0.20 (95%CI 0.06–0.57). With an odds ratio (OR) of 0.2, this means that there is an 80% decrease in the odds of a household member responding 'no,' i.e., sleeping hungry. An increase in the number of unemployed members results in an increase in the number of people reporting 'sleeping hungry'. Even though this result is consistent with those of other studies, in one study by Sekhampu [18], the coefficient for the variable was not statistically significant and it was negative, but this did not explain variations in food security. The results showed that the lack of employment and a decrease in household income were associated with increased chances of being food insecure. The study further indicated a statistically significant association between the number of household members on a social security grant as a source of income and the following food security questions: FS1 (not enough food) and FS7 (no food), with *p*-values of 0.03 and 0.051, respectively. Interestingly, an increase in the number of members on social grants resulted in a corresponding increase in the number of people who reported "not having enough food" and "no food at all". This could be a result of the fact that, for an individual to be on a social grant, one has to be unemployed, and, in turn, social grants themselves are meager sources of income that are perhaps not sufficient to meet the food needs of households. The provision of social security grants has proven to be beneficial to some extent in assisting households to have income to purchase their own food [37]. However, the social security grants are not able to eradicate the level of food insecurity of poor households. Using a chi-squared test, the study indicated a statistically significant association between "no income" and the following food security questions: FS1 (not enough food) and FS7 (no food), with p-values of 0.03 and 0.051, respectively. This means that an increase in the number of household members with no income results in a corresponding increase in people with not enough food (FS1) and no food at all (FS7). This was an expected outcome, as there is consensus in the findings of previous studies that household income is the most important economic influencer of household food insecurity (Sekhampu [18]; Dunga and Dunga [19]; De Cock, D'Haese, Vink, Van Rooyen, Staelens, Schönfeldt, and D'Haese [20]; Olagunju, Babatunde, and Ajiboye [21], Zakari, Ying, and Song, [22]; Nkomoki, Bavorova, and Banout [23]; Drysdale, Bob, and Moshabela [24]).

The results also showed that there was a close association between the level of household food (in)security and the demographic variables of a household, such as gender, age, education levels, household size, and the number of people per household. Food insecurity was more prevalent in households with a larger household size and in households with females. The impact of gender was of great interest, as it revealed an unexpected outcome. The results indicated that there was a statistically significant association between the number of males in the household and the response to question FS1, which was related to 'not enough food', with a *p*-value of 0.009. This study demonstrated that an increase in the number of male members in a household resulted in a decrease in the number of household members reporting 'not enough food'. Furthermore, the results showed that household members had various skills. However, while there is no direct association between the skills of household members and the level of household food (in)security, the results provide a significant indication of the household skills or assets that can be harnessed in designing effective solutions. A household's assets are of central importance to the asset-based and livelihood approaches. A household's ability to generate income is based on these assets, so understanding the key assets needed to establish and sustain livelihoods is critical in understanding how households will cope in the face of unanticipated events, whether they be positive or negative [38].

5. Conclusions

The purpose of this study was firstly to determine the food security status of households and the skills of household members in Ward 60 of the Nelson Mandela Bay Municipality in the Eastern Cape Province in South Africa. From the sampled households, the results show some variations in food security. It is evident that the majority of households in Wells Estate in Ward 60 are severely food insecure, and the situation is exacerbated by the socioeconomic impacts of poverty and unemployment. As has been the global experience, the COVID-19 pandemic has introduced another layer of vulnerability for households. The second purpose of the study was to determine the associations between the socioeconomic and demographic variables of the households and their levels of food (in)security. The results show a significant association between household food security and the following variables: unemployment, income, and gender. A household's employment and income status impacts its household food security. The results show a significant unemployment rate and low income status rate, as most household members relied more on social security grants for income, and this seriously impacted the extent of household food security. The results show that the lack of employment and a decrease in household income were associated with increased chances of being food insecure. An increase in the number of unemployed members results in an increase in the number of people reporting sleeping hungry. The study also demonstrates that an increase in the number of male members in a household results in a decrease in the number of household members reporting 'not enough food'. This study provides insight into the reality of the challenge and severity of household food insecurity in low-income suburban households, which cannot be ignored. Delineating the associations between the demographic and socioeconomic variables that influence household food security provides important information that can help to inform decisions by the government, local municipalities, NGOs, and other stakeholders towards designing effective solutions for enhancing household food security. The results of the skill inventory showed that the households had a variety of skills. Food insecurity was more prevalent in households with a larger household size and in households with females. These results provide a significant contribution towards designing effective future solutions that specifically target women and youth, given the historically lower income rates for women.

6. Recommendations

It is recommended that the development of solutions for alleviating food insecurity be informed by these key findings. For example, the current study showed that Ward 60 had a relatively young cohort of residents in the area studied and that female-headed households tended to be more food insecure. With the skills that they already possess, they can be empowered to combine a set of activities, such as agriculture, trade, entrepreneurship, co-operatives, and informal employment, to achieve sustainable livelihood goals, thereby enhancing food security. Making productive land available and up-skilling young people and women to use land productively can contribute significantly to reducing food insecurity. Previous research has shown that households have higher chances of being food secure if they have productive agricultural land, food gardens, and increased income levels. Young people and women should be empowered by strengthening their skills and capacities to achieve secure livelihoods. It is further suggested to ensure the sustainability of solutions by developing local capacities through collaborative community-based participatory actions as a means of harnessing existing community assets for improving program outcomes. Such outcomes should be aimed at implementing sustainable localized agricultural food production systems and community-based income-generating interventions focusing on asset-based and sustainable livelihood strategies. It is also suggested that household food security can be enhanced by strengthening the food production skills and capacities of household members with the aim of implementing bio-diverse household and community gardens within a localized food production system in alignment with food sovereignty principles. This will ensure that local households produce and/or market locally produced food products for the local consumption of local people, which will ensure that local people have access to nutritious and healthy food.

7. Future Research

The results presented are for the first phase of the study: problem identification. As a follow-up of this baseline household survey, transdisciplinary research needs to be conducted to explore a more nuanced view of the households and possible barriers to household food security. Future research will be to embark on the second phase of the CBPAR, which involves designing solutions for enhancing household food security. In implementing phase two of the CBPAR process, namely, designing solutions, a transdisciplinary team of stakeholders from academic and non-academic disciplines will partner with residents of Ward 60 to explore transdisciplinary pathways towards enhancing household food security for the people of Wells Estate. Funding has already been secured to continue with phase 2 of the research in 2022.

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Institutional Review Board Statement: The study was conducted in accordance with the Belmont Report (1979), and the protocol received ethical approval from the Nelson Mandela University institutional Research Ethics Committee (Human) [H20-HEA-SDP-005], on 7 September 2020.

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