

Household level determinants of food security in the City of Tshwane, South Africa

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Abstract

Food security has always been a contemporary issue in urban South Africa, which is gripped by high inequality. This has recently been exacerbated by risks and hazards pertaining to climate change and the more recent COVID-19 pandemic. The objective of the study was to ascertain the food security status and the determinants thereof for urban households in the City of Tshwane. The Household Food Insecurity Access Scale (HFIAS) and Multinomial Logistic Regression were used to scale the patterns of household-level determinants of food security of 775 households, distributed in 73 clusters, from the 7 regions of the City of Tshwane, South Africa. The study found that 39.2% of the households were food secure, 16.6% suffered from mild food insecurity, 12.1% were moderately food insecure, and 32.1% were severely food insecure. Food security was significantly more prevalent in male-headed households, households with younger members, households with educated heads, and those that are employed. Household size and income were also determinants of food security. The results indicate that age, gender (male), education, employment, household size, income, and grant type were significant at the 1% level in extreme changes in food insecurity, while only the grant was insignificant in mild changes in food security, with none of the variables being significant in slight food security changes. Government social grants were inadequate to guarantee food security status. The study concludes that there are extremes of food security and severe food insecurity indicating inequality, with various socio-economic factors affecting food security.

1. Introduction

Food security is established when "all people, at all times, have physical and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (Food Agriculture Organisation, 2006). According to Mbow *et al.* (2019), despite the fact that food supplies have been increasing globally since 1961, there are still 821 million undernourished people who do not have access to food, 151 million stunted children under the age of 5 years, 613 million females aged between 15 and 49 suffering from iron deficiency, and more than 2 billion overweight or obese adults. It is also estimated that more than 2 billion people experience micronutrient deficiencies, with a third of the people in developing countries being food insecure (Perez-Escamilla, 2017).

Food insecurity and hunger affect urban and rural populations alike in quite a number of developing countries. Therefore, local governments make use of different strategies to improve food insecurity (Mazenda and Mushayanyama, 2021). Food insecurity and hunger are caused by a lack of food access rather than a lack of food provision (Sen, 1981). At the household level, food access is achieved when a person receives an adequate quantity of food and sufficient quality to guarantee a nutritious and safe diet (Sen, 1981). In order to accomplish access to food, both domestic and local foods should be accessible, and most importantly, households should also have access to the essential means to obtain food.

Food security has always been a problem in South Africa, especially at the micro-scale. This was further worsened by the COVID-19 pandemic in the first quarter

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of 2020 and the July riots in 2021. For instance, a report by Statistics South Africa (StatsSA) (2020) indicated that due to the COVID-19 pandemic, 8.1% of the employed or employers had lost their jobs or closed their businesses, with 1.4 percent becoming unemployed. There was a 10.20% increase in people with no income, with those with a salary decreasing from 76.6% before the lockdown to 66.7% in the sixth week of the lockdown. The proportion of individuals who reported experiencing hunger increased by 2.7% (StatsSA, 2020). The riots that occurred between July 10 and 14, 2021, exacerbated the situation, particularly in KwaZulu-Natal and Gauteng provinces (Tatsvarei *et al.*, 2021). Localized food security systems were thus required to circumvent current and future food insecurity issues in the country.

The City of Tshwane in the Gauteng province, South Africa, has made several plans to reduce food insecurity. The Food Security Policy and Strategy (FSPS), implemented in 2009, is the most prominent of the food insecurity plans implemented in the City of Tshwane, with the goal of achieving a victorious city through fairness, time, and freedom by encouraging accelerated growth, job creation, and poverty reduction (Mazenda and Mushayanyama, 2021). The Integrated Development Plan (IDP) of 2017–2022 identified high levels of poverty in the city as a permanent restriction to the medium-to-long-term development of the city. The city introduced the Expanded Public Works Program (EPWP) in 2013, as part of the 5-year plan to eradicate poverty and to create clean, safe, healthy, and sustainable communities. The expectations of the plan were to reduce poverty by increasing income through short-term job opportunities (Mazenda and Mushayanyama, 2021). Then, the question is whether the City of Tshwane's food security programs justifies the food security status of the households.

Various socio-economic factors, such as employment, education, gender, ownership of assets (Blekking *et al.*, 2019), social security, income, household size (Anand *et al.*, 2019), and demand (Song *et al.*, 2020), have been identified in the literature as being determinants of food security in urban settings. Harris-Fry *et al.* (2015) emphasize the vital role of food support, income, household size, education, grant support, and indigency as determinants of urban food security. To concur with this, Akinboade and Adeyefa (2018) and Ngema (2018) emphasize the essence of income child support grants and the empowerment of women to control and make financial household decisions. On the other hand, Mwanga (2019), Dunga (2020), and Ningi *et al.* (2021) posit household size, female-headed households' education, age, and

unemployment as significant determinants of food security.

The studies mentioned have a common thread in determining the determinants of food security in an urban setting, mostly in South Africa and other emerging economies drawing on the multinomial logistic regression technique, or binomial logistic regression. The study expands on Akinboade and Adeyefa (2018), who were selective in only 3 regions of the poor black population in the City of Tshwane. As such, the study adds to the literature by embedding the Household Food Insecurity Access Scale (HFIAS), treated as a dependent variable in the study, against various food security determinants in a multinomial logistic regression setting in the 7 regions of the City of Tshwane to account for the various statuses of food security.

2. Materials and methods

The study employed a quantitative cross-section design, with the aid of a structured questionnaire, developed to measure the household food insecurity aggregates of the City of Tshwane and food-insecure households in South Africa. The 2016 Consumption Survey contains 3 questions relating to food security in South Africa. It is from this study that the City of Tshwane was singled out to have a higher prevalence of food insecurity with severity than other municipalities. Drawing on such information, against the hive of food security-related interventions employed by the city, required an in-depth investigation. As such, to validate such claims, a sample comprising 775 households from the 7 regions of Tshwane was drawn through a primary field survey, sponsored by the University of Pretoria Department of Research Innovation and Support (DRIS). The households were selected in clusters at the ward level. A two-stage sampling scheme was utilized to guarantee cost-effectiveness and representativeness, with the initial stage encompassing the election of clusters utilizing a Probability Proportional to Size (PPS) scheme without replacement (WOR) and the second stage comprising of systematic sampling of households with an erratic start in the clusters that were chosen. A total of 73 clusters were selected by utilizing PPS, WOR, and an established systematic household sample with an erratic start-up of 15 households per cluster. The significance of clustering was to minimize the cost of enumeration.

The data was analysed using the HFIAS and the multinomial regression analysis model. The HFIAS questionnaire entailed questions about the respondents' food insecurity experiences. Following each item was the prevalence of occurrence, which investigated how often a given situation happens. Responses that were negative were scored as "0", rarely scored as "1", sometimes

scored as "2," and always scored as "3". The HFIAS scale provides an image of households in several food security levels based on their situation on a scale of 0-27. To ascertain the level of food insecurity, households that respond to at least three or more of the food insecurity conditions are categorized as food insecure, which simply means that they are sometimes not able to have access to sufficient food for one household member or for all the members. Those households that never worry about having access to adequate food for one or more household members are said to be food secure, meaning that they have the ability to provide three full meals per day without the food getting finished. According to Coates *et al.* (2007), a *food-secure household* encounters none of the conditions of food insecurity or may rarely encounter a worry. A *mildly food insecure household* is concerned about not having adequate food sometimes or always, and or is not able to have the food of their preference or eats more of the same foods or foods that they do not really like, but just in rare cases. A *moderate food-insecure household* does not really care much about the quality of the food they eat as they resort to eating the same foods that they do not really like sometimes or always, and or they reduce the quantities of the meals they have by maybe skipping another meal of the day or the size of the meal, sometimes or in rare cases, but they do not encounter any of the three most severe conditions (food getting completely finished, going to sleep on an empty stomach, or going both day and night without food). A *severely food insecure household* cuts back on meals and meal sizes very frequently, and or encounters any of the three most severe conditions very frequently. People who live in a house where one of the three most severe conditions has happened even once in the last month are said to be very food insecure.

A multinomial logistic regression analysis was utilized to determine the relationship between the determinants of household food security and the household food insecurity access scale. The study draws on Mota *et al.* (2019), who assessed food security and its determinants amongst rural households in Ethiopia. According to Omidvar *et al.* (2013), a multinomial regression analysis model identifies the impact of a variety of independent variables on one or two dependent variables. It accommodates dependent variables that are not continuous, especially when it has only two outcomes. In the model, the higher-order category was used as the reference for both the outcome and explanatory variables, so the odds ratio can be used to figure out how likely it is that a household will not have enough food.

The model was aimed at evaluating the chances of the occurrence of a certain event as well as planning the

effects of the variables that are explanatory on these odds. The occurrence of the odds indicates the likelihood that an event will be successful and the likelihood that an event will be a failure. Food insecurity access is the dependent variable and is measured by the Household Food Insecurity Access Scale (HFIAS) using 9 questions in the multinomial regression model. The nine questions were given out on a four-point scale. The food insecurity levels are designated as food secure, mildly food insecure, moderately, and severely food insecure households based on the HFIAS scale indicator and the replies to the 9 questions. Based on the literature review, various independent variables were taken into consideration. These independent variables were: age of the household head; gender of the household head; income of the household; employment status of the household members; and those that depend on government social grants.

The model considered a random variable y_i which took various distinct values of $j = 1, 2, \dots, L$ and the response L categories collectively exclusive and exhaustive (Shah, 2020). We assumed that; π_{ij} was the odds that the i -th response fall in the j -th category that is $\pi_{ij} = \Pr \{Y_i = j\}; j = 1, 2, \dots, L$. Therefore, we had $e^{\sum \pi_L}; j = 1 = 1$ for each l and there are only $L - l$ categories.

We considered the multinomial logit model that is the models of log-odds for M covariates associated with i -th individual is demonstrated by:

$$\ln \frac{\pi_{ij}}{\pi_{iL}} = \beta_{j0} + \sum_{k=1}^M \beta_{jk} X_{ik}; j = 1, 2, \dots, L - 1$$

Where $0 \leq \pi_{ij} \leq 1, j = 1, 2, \dots, L - 1$, and X_{ik} ($i = 1, 2, \dots, n; k = 1, 2, \dots, M$) were the explanatory variables. The stipulations of the model β_{j0} and β_{jk} were assessed based on the highest odds which follows the Newton-Raphson iterative method (Shah, 2020). The equation concurrently explained the effect of X on the above $L - l$ logits considering the reference category L . The impact had a probability of being diverse according to the matched response and was calculated as:

$$\frac{\pi_{ir}}{\pi_{is}} = \frac{\pi_{ir}}{\pi_{iL}} - \frac{\pi_{is}}{\pi_{iL}}$$

Where $r \neq s = 1, 2, \dots, L - 1$.

3. Results and discussion

3.1 Descriptive statistics

Table 1 indicates that 62% of the households are headed by female household heads. Households typically have 3 to 6 members, with household heads ranging in age from 31 to 39 years. In general, household income levels were low, with roughly half of all households earning less than R3,500 (US \$214) per month, a key

indicator of food insecurity. This goes along with a decline in access to social security grants. Around 47% of households do not have access to household social support. Access is concentrated on children's and elderly welfare, affecting 30% and 19% of households, respectively, leaving the majority of the population exposed.

Table 1. Descriptive statistics

Variable		Total	%
Gender	Male	293	37.8
	Female	482	62.2
Age (Mean = 38.6)	30 and below	252	33
	31-39	202	26
	40-49	135	17
	50 and above	80	10
Household size (Mean = 3.92)	1-Feb	198	25
	3	124	16
	4	129	16
	5	114	14
	6	69	9
	7	38	5
	Income (Mean = R1601-R3200)	No income	40
R1-R400		26	3
R401-R800		41	5
R801-R1600		95	12
R1601-R3200		201	25
R3201-R6400		105	13
R6401-R12800		79	10
R12801-R25600		57	7
R25601 and above		47	6
Social grant	No grant	366	47
	Child support	237	31
	Older person	150	19
	Disability	9	1.2
	Grant in aid	1	0.1
	Care	1	0.1

3.2 Household food insecurity status

The household food insecurity status draws from the frequency of responses to the HFIAS questions. The nine questions were graded in three categories on the frequency of occurrence; 1 = Rarely (once or twice in the past four weeks); 2 = Sometimes (three to ten times in the past four weeks); and 3 = Often (more than ten times

in the past four weeks).

The distribution of responses to the nine questions in HFIAS is presented in Table 2. About 15.2% of households worry that food would run out while 9.3% experienced an actual lack of any food within the household, and about 3.4% had gone to sleep hungry more than once.

Household Food Insecurity Prevalence (HFIP) status indicator can be used to report household food insecurity (access) prevalence and make geographic targeting decisions. The indicator shows the percentage of households that fall in any of the four-food insecurity (access) categories. For example, percentage of severely food insecure households = (Number of households with HFIA category = 4/Total number of households with an HFIA category *100.

According to Table 3, 32% of households were severely food insecure, 12.1% were moderately food insecure, 16.6% were mildly food insecure, and 39.2% were food secure. The results are closely aligned with a study by Rudolph *et al.* (2012) in Johannesburg that showed that 27% of the households were severely food insecure, 15% moderately, 14% mildly, and 44% were food secure. De Wet *et al.* (2008) also found that in Johannesburg, 41% of households were severely food secure, 26% moderately, 7% mildly, and 16% were food secure. The differences can be attributed to the different types of households that were included in the studies, where Rudolph *et al.* (2012) concentrated on Orange Farm, the Inner City and Alexandra, whilst De Wet *et al.* (2008) also added areas such as Riverlea, Doornkop, Diepsloot and others, which were different to this study. These areas tend to have the poorest households in Johannesburg. Furthermore, besides differences being

Table 3. Household Food Insecurity Prevalence

Variable	Frequency	Valid Percentage	Cumulative Percentage
Food secure	304	39.2	39.2
Mildly food insecure	129	16.6	55.9
Moderately food insecure	94	12.1	68.0
Severely food insecure	248	32.0	100.0
Total	775	100.0	

Table 2. Frequency of responses to the HFIAS questionnaire

HFIAS question	None	Rarely	Sometimes	Often
Worry about food	389 (50.2)	100 (12.9)	168 (21.7)	118 (15.2)
Unable to eat preferred foods	395 (51)	74 (9.5)	177 (22.8)	128 (16.6)
Eat just a few kinds of food	385 (49.7)	74 (9.5)	173 (22.3)	143 (18.5)
Eat unwanted food	398 (51.4)	71 (9.2)	179 (23.1)	127 (16.4)
Eat a smaller meal	439 (56.6)	59 (7.6)	144 (18.6)	133 (17.2)
Eat fewer meals in a day	452 (58.3)	55 (7.1)	152 (19.6)	116 (15.0)
No food of any kind in the household	544 (70.2)	62 (8.0)	97 (12.5)	72 (9.3)
Go to sleep hungry	657 (84.8)	27 (3.5)	65 (8.4)	26 (3.4)
Go a whole day and night without eating	676 (87.2)	33 (4.3)	42 (5.4)	24 (3.1)

spatial, they can be temporal as well, showing differences through time, where the study by Rudolph *et al.* (2012) was conducted in 2012, and by De Wet *et al.* (2008). The current study was conducted in 2019.

3.3 Determinants of household food security

Table 4 presents the findings of the multinomial logistic regression analysis. The model was tested for adequacy to determine the proportionate improvement in the model fit using the Nagelkerke R^2 and the Likelihood Ratio Chi-Square Test, both reported by the SPSS package. While the R^2 for the linear model is interpreted as the proportion of the variation in the response that the regressors can explain, there is no clear interpretation of the pseudo-Nagelkerke R^2 in terms of the variance of the outcome in multinomial logistic regression (Hu *et al.*, 2006). According to Allison (2014), two types of R^2 , the Cox R^2 and Snell R^2 value, cannot reach 1.0. However, Nagelkerke modified them. The modification increases the Cox and Snell version to make 1.0 a possible value for R^2 . Therefore, Nagelkerke R^2 of 0.251 shows a strong association between the model and the dependent variable. As stated, the chi-square test is interpreted to assess the overall significance of the model in this study. The hypothesis underlying the Chi-square test highlights that when the p-value of the Chi-square is below 0.05, it

shows the goodness of fit. The findings show that the value of Chi-square is equivalent to 202.877, and it is statistically significant at a 1% level. Therefore, the adopted model confirms the goodness of fit since all p-values for step, block, and model are statistically significant at a 1% level. Both the Nagelkerke R^2 and the Likelihood Ratio Chi-Square tests suggested adequate improvement of the model.

Table 4 shows that, with reference to the first reference group of highly food-secure individuals, in terms of gender, males are more likely to be highly food-secure compared to females ($\beta = 0.732$, $p = 0.001$). The odds ratio shows that they are twice as likely to fall under the category of "highly food secure" compared to their female counterparts. The results were similar to those of De Wet *et al.* (2008) and Omidvar *et al.* (2013) but contrary to Rudolph *et al.* (2012). Males are better off in terms of income and can offset their food insecurity, despite spending a large portion of their income on food (Akinboade and Adeyefa, 2018; Anand *et al.*, 2019). This is exacerbated further by females' lower educational attainment and participation in low-income generating activities (Ningi *et al.*, 2021). Ngema (2018) went on to suggest that in terms of stability, young females had more variance in food security compared to older ones.

Table 4. Multinomial logistic regression analysis

HFIAS Category		B	Std. Err	Wald	Sig.	Exp(B)
Food secure	Intercept	-3.981	0.916	18.880	0.000	
	Age	-0.263	0.076	11.852	0.001	0.769
	Education	0.454	0.128	12.653	0.000	1.574
	Employment	0.282	0.053	28.608	0.002	1.326
	H size	-0.150	0.049	9.338	0.000	0.861
	Income	0.190	0.042	20.715	0.000	1.209
	Grant type	-0.430	0.109	15.526	0.000	0.650
	Gender (male)	0.732	0.206	12.582	0.000	2.080
Mildly food insecure	Intercept	-3.564	1.083	10.839	0.001	
	Age	-0.163	0.088	3.429	0.064	0.849
	Education	0.361	0.149	5.899	0.015	1.435
	Employment	0.287	0.061	22.164	0.000	1.333
	H size	-0.147	0.058	6.523	0.011	0.863
	Income	0.116	0.049	5.637	0.018	1.123
	Grant type	-0.112	0.106	1.120	0.290	0.894
	Gender (male)	0.413	0.246	2.809	0.094	1.511
Moderately food insecure	Intercept	-0.611	1.168	0.273	0.601	
	Age	-0.138	0.097	2.018	0.155	0.871
	Education	0.101	0.144	0.493	0.483	1.106
	Employment	0.077	0.066	1.354	0.245	1.080
	H size	0.007	0.056	0.014	0.907	1.007
	Income	0.008	0.053	0.021	0.886	1.008
	Grant type	-0.065	0.110	0.349	0.555	0.937
	Gender (male)	-0.167	0.286	0.344	0.558	0.846
Model summary						
X^2	202.877	Sig.	0.000			
Cox and Snell	0.232					
Nagelkerke	0.251					
McFadden	0.103					

The young are likely to be highly food secure compared to the elderly ($\beta = -0.263$, $p = 0.000$). The odds of this happening are 76.9%. As noted by Mazenda and Mushayanyama (2021), the younger household heads are more likely to be food secure compared to the older ones, as the older household heads are faced with more responsibilities and vast sizes of households, which in turn exert pressure on the disposable household income and lead to a high likelihood of facing food insecurity challenges. Furthermore, the young are still economically active and can engage in gainful income-generating activities.

Those more educated are likely to be more food secure compared to the less educated ($\beta = 0.454$, $p = 0.000$). The odds ratio shows that they are 1.6 times more likely to fall under the highly food-secure category compared to their less-educated counterparts. According to Oldewage-Theron and Egal (2021), poverty has been connected to levels of education, and low levels of education are the contributing factors to poor nutrition practices. Likewise, Shah (2020) confirms that the education of the household head is the most important determinant of food insecurity. In addition to this, higher levels of education are associated with the ability to access food. This is due to the ability to engage in gainful employment based on educational and skill levels.

Those employed are likely to be more food secure compared to those not employed ($\beta = 0.454$, $p = 0.000$). The odds ratio shows that they are 1.6 times more likely to fall under the highly food-secure category compared to their less-educated counterparts. Engaging in full-time employment will increase food security (Rudolph *et al.*, 2012). Blekking *et al.* (2019) went on further to identify that households engaged in formal employment exhibited more food security compared to households in informal employment. This also had a bearing on the purchase of food, where there was a predominant use of formal markets by those that were formally employed and had a higher income relative to informal markets utilised by households with informal employment and lower incomes.

Smaller household sizes are more likely to be highly food secure. ($\beta = -0.150$, $p = 0.002$). The odds ratio is 86.1%. A study conducted by Akinboade *et al.* (2016) confirms that a larger household exerts pressure on the consumption of food and therefore increases the chances of a high level of food insecurity. Furthermore, as the household composition becomes dominated by children and the elderly (a high dependency ratio), the higher levels of food insecurity. This can also be the case when household size increases due to inward migration. It is

because they are putting too much pressure on the consumptive base and making little or no effort to get food.

Those that depend on grants from the government are more likely to be food insecure. ($\beta = -1.12$, $p = 0.000$). The odds ratio is 65%. Oldewage-Theron and Egal (2021) note that a household cannot cope with social grants alone, as the grants are not enough to eradicate poverty. A household that receives social grants is, therefore, more likely to be food insecure. On the other hand, Akinboade *et al.* (2016) claim that social grants increase household disposable income and purchasing power, thereby improving access to food. Mazenda and Mushayanyama (2021) attest that the grants are inadequate to meet food security needs, especially for large households. Harris-Fry *et al.* (2015) went on to assess which type of social grant was more significant for food security. They identified that recipients of child grants were worse off in terms of severe food insecurity compared to other types of social grants in the City of Tshwane. This is despite identifying that amongst poor households, grants tended to improve food security.

Those with a higher income are more likely to be food secure. ($\beta = 0.190$, $p = 0.000$). The odds ratio shows that they are 1.2 times more likely to fall under the highly food-secure category compared to those that depend on grants. Similar findings were observed by Rudolph *et al.* (2012). Dunga (2020) defined income as all the money that the members of a household receive on a monthly basis from different sources. He further states that income is viewed as the most crucial determinant of food insecurity. Households with higher incomes are more likely to be food secure in comparison to those with lower incomes.

Table 4 further shows that when the mildly food secure are taken into consideration, the most educated households' heads are 1.6 times more likely to be highly food secure compared to the less educated ($\beta = 0.0454$, $P = 0.000$). Employed heads of households are 1.6 times more likely to be highly food secure compared to those not employed ($\beta = 0.454$, $P = 0.000$). Smaller household sizes are more likely to be highly food secure than larger household sizes ($\beta = -0.150$, $P = 0.0002$). The odds ratio is less than one (0.861). Households with a moderate income are 1.2 times more likely to be food secure compared to those with a low income ($\beta = 0.190$, $P = 0.000$). The results were statistically insignificant for age, grant type, and gender.

In terms of the moderate food security, Table 4 shows that the results were statistically insignificant. The cause of the insignificance could have been the fact that

the number of respondents in this category was very low. As shown in Table 1, there were only 94 of the 775 households in this category, which is quite a small sample to reveal a significant ratio.

4. Conclusion

Food security is a worldwide problem and affects the urban poor living in developing countries. The purpose of this study was to investigate the elements that affect the status of food insecurity in the urban areas of the 7 regions of the City of Tshwane, South Africa. The multinomial regression analysis model was utilised, and all diagnostic checks were satisfied. On the basis of the findings, it can be concluded that food insecurity within households in the urban city of Tshwane increases with a decrease in income, with a lack of educated household members, with female-headed households, and with an increase in those that depend on social grants from the government. On the other hand, food insecurity decreases when the household has an adequate income.

It is therefore clear that the urban food insecurity in the City of Tshwane is struggling as a result of limited resources. This confirms that the South African population in urban areas is more food insecure due to high rates of unemployment and poverty. The prime restorative measures may be those that provide some relief in terms of income and increase their usable income to lessen the chances of malnutrition and allow smaller portions of food. Policy-makers in the country also need to consider access to food programs, considering the level of food insecurity and its effects.

It is recommended that the City of Tshwane municipality implement food security policies that address the needs of vulnerable households. Mazenda and Mushayanyama (2021) write that people should be educated in a structured way to ensure that the right to a healthy diet is established. Therefore, in accordance with the Food and Agriculture Organization (FAO) (2014), the City of Tshwane must make sure that its policies for food security have systems in place to track the food security situation of vulnerable groups, specifically children, women, and the elderly, as well as track the level of micronutrient deficiencies. Mazenda and Mushayanyama (2021) further state that the food policies in the city need to increase the productivity and consumption of a nutritious and healthy diet by including certain designs, management, monitoring, and evaluation, as well as the implementation of certain programs. It is therefore recommended that the City of Tshwane should implement a food oversight structure and develop strategies to respond to the temporal dimensions of food security (time-specific state and

NGO safety nets, i.e., soup kitchens). Furthermore, food policies within the City of Tshwane should allow for advanced undertakings to escalate food security access in poor communities by means of implementing urban agriculture initiatives. An example would be the Johannesburg Metropolitan Municipality, which has promoted having food gardens at home and in schools. The findings of the study have proven that the main contributing factor to food insecurity is a lack of income or affordability. Therefore, food policies that bring an increase in food access are highly recommended for the food-insecure households in the City of Tshwane. As a result, we suggest food policies that will set up food banks, where urgent food is given to people who don't have enough to eat, as well as basic food price monitoring mechanisms that will help people shop more economically.

Conflict of interest

The authors declare no conflict of interest

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