Research article

Food insecurity among low-income households in Addis Ababa, Ethiopia

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A B S T R A C T

With the rapid urbanization in developing countries, poverty and food insecurity are becoming increasing prevalent, posing a major challenge to urban areas. The COVID-19 pandemic induced job losses and reduced income combined with inflation have further exacerbated the household food insecurity situation, particularly in cities of low-income countries. Our study aims to assess the extent of food insecurity and its determinants among low-income household in Addis Ababa, Ethiopia. We conducted a community-based cross-sectional study among a sample of 578 households in Addis Ababa. We estimated the household food insecurity status using the Household Food Insecurity Access Scale (HFIAS). An ordinal logistic regression model was used to assess the relationship between household food insecurity status and the socioeconomic and demographic covariates. The STATA 14 software package was used for data analysis. We found that household food insecurity was prevalent among low-income households in Addis Ababa, with a prevalence rate of 92.4 % (95 % CI: 90.2–94.6 %). Of these households, 33.6 % (95 % CI: 29.7–37.4 %) were severely food insecure. To cope with the food shortage, households were forced to reduce their food quantity and quality. We also found that respondent's education, engagement in income generating activities, and household wealth were independently associated with household food insecurity. We conclude that although supporting people living below the poverty line (pro-poor) remains the top priority for social protection programs, adapting the program to accommodate the working poor (informal sector employees and casual workers) is crucial, especially during shocks.

1. Introduction

Food insecurity – the lack of consistent physical, social and economic access to sufficient, safe and nutritious food for every person in a household to live an active and healthy life – has negatively impacted the lives of individuals and their families around the world. In 2021, an estimated 2.3 billion people (29.3 % of the global population) lacked access to adequate food while 11.7 % of them faced severe food insecurity [1]. Africa bears the heaviest burden; where an estimated 798.8 million people (59.6 % of the total population)

were moderately or severely food insecure – and 346.4 million of them were severely food insecure [2]. Creating a world free of hunger by 2030, as laid down in the Sustainable Development Goal 2 (SDG 2), is still an active agenda for Africa [2].

As one of the African nations with the second largest population, Ethiopia has been struggling with food security crisis for decades. Between 2018 and 2020, about 58 % of Ethiopians suffered from moderate to severe food insecurity, mostly resulted from droughts and poor harvest [2]. Food insecurity in the country is further aggravated by conflicts and natural disasters, such as droughts and floods, occur in different parts of the country [3,4].

Over the last few decades, rural poverty rate has declined in developing countries, but urban poverty has remained unchanged. With the rapid urbanization in developing countries, poverty and food insecurity are increasing dramatically and becoming a major concern of urban areas [5]. However, the issue of food insecurity in urban areas has not received the attention it deserves although urban dwellers are merely dependent on the market for their food supply and therefore need stable income and affordable food prices to ensure their food security. Furthermore, access to public or social protection support is limited for the urban poor and puts them in a vulnerable situation during income loss and food price shocks [5].

Market-based food supply, increased food prices, household income, household size, access to credit, occupational and educational status of the household head were identified as causes for food insecurity in Addis Ababa [6–8]. These causes are being aggravated by the COVID-19 pandemic impacts which has deterred the social and economic activities that could have contributed for better coping. The job losses and drop in income [9–11], the closure of food-providing centers such as the school feeding programs [9,12], food price inflation and conflicts [9,13] may have pushed the bar for food insecurity in Addis Ababa further high. Thus, this study aimed to assess the extent of food insecurity and its determinants among low-income households in Addis Ababa, Ethiopia.

2. Materials and methods

2.1. Study design and setting

We have conducted a community-based cross-sectional study in Addis Ababa, the capital city of Ethiopia and Africa's diplomatic capital. The city has a projected population of 3.86 million in 2022, which is 16 % of the country's urban population [14]. The city is home for 22 % of the national urban poor [15]. In early 2021, the city has reported the highest unemployment rate of 22.1 % compared to other regions in Ethiopia [11].

2.2. Study population and sampling

The study population are all households who have at least one child attending primary schools in one of the public primary schools in Addis Ababa. To determine sufficient sample size to estimate the extent of household food insecurity, we have used a single
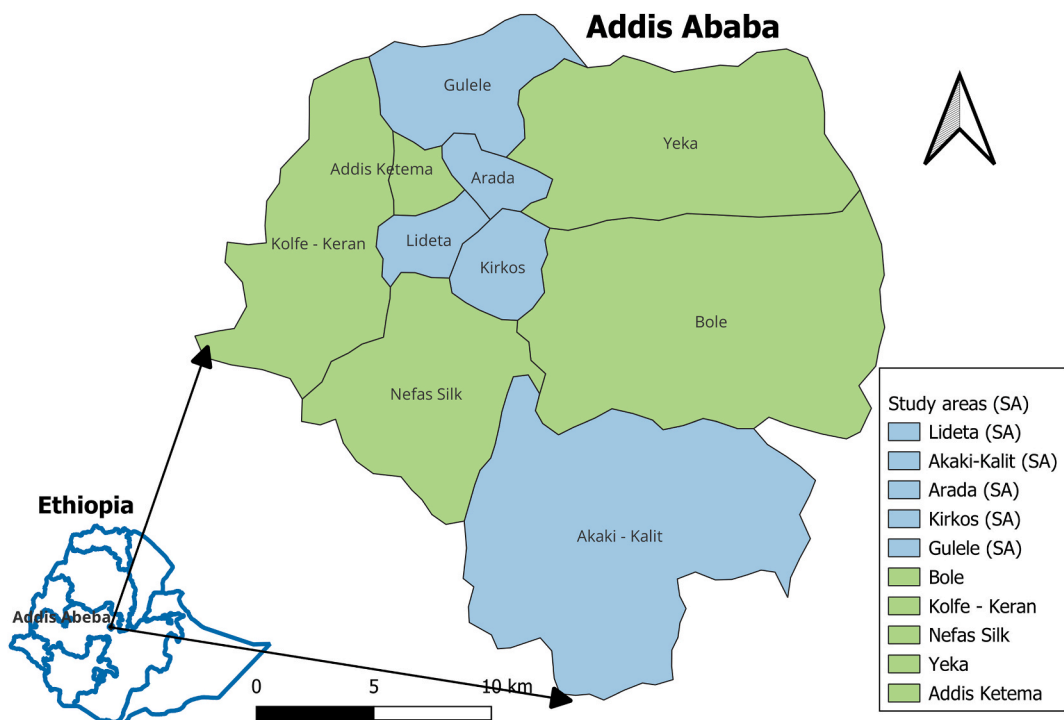
Fig. 1. Map of the study area (note that Lemi Kura sub-city – not shown in the map – is made of portion of land from Bole and Yeka sub-cities).

population proportion formula [16]. Assuming a confidence level of 95 %, margin of error 5 %, an estimated household food insecurity prevalence of 75 % in Addis Ababa from previous study [6], and a design effect of 2; the sample size was calculated to be 578 households.

Based on the concentration of poor households as per the Ethiopia Poverty Assessment report, we have selected 6 sub-cities with the largest cluster of poor households out of the 11 sub-cities in Addis Ababa [15]. The selected sub-cities are: Akaki-kality, Arada, Gulele, Kirkos, Lemi Kura, and Lideta sub-cities (Fig. 1). From the sub-cities, we randomly selected kebeles (the smallest administrative units in Ethiopia). We identified low-income households in the selected kebeles through the school type they send their children; low-income households tend to send their children to public or community schools [17]. We allocated the calculated sample size equally across the sub-cities (~97 per sub-city).

To identify the study households within the selected kebeles, we located a central position within the kebele and chosen a random direction by spinning a pen. Then, we visit the first house and inquire whether they have school-age children and where they attend primary school, whether it is public, community, or private. If they send their children to public or community schools, then we seek their verbal consent and collect data. Otherwise, we visit the fifth house and follow the same procedure. If more than one household is found in a given house, we randomly select one of them. This procedure continued until we got the required sample size from each of the sub-cities.

2.3. Variables and measurements

Household food insecurity status. The outcome variable, the household food insecurity status, was estimated using the Household Food Insecurity Access Scale (HFIAS) – a set of questions associated to the experience of food access that appeared to distinguish food-secure from food-insecure households across different cultural contexts. HFIAS has nine occurrence questions (yes or no), followed by a frequency-of-occurrence question to determine whether the condition happened rarely (once or twice), sometimes (three to ten times), or often (more than ten times) in the past four weeks. The HFIAS occurrence questions relate to three different domains of food insecurity: anxiety and uncertainty of food supply, insufficient food quality, and insufficient food intake and its physical consequences [18]. The HFIAS tool is validated in developing countries, including Ethiopia, to measure the access components of food insecurity in urban and rural settings [19]. The continuous HFIAS score is categorized into four levels of household food insecurity (access) prevalence: food secure, and mildly, moderately and severely food insecure [18].

Covariates and categories. Demographic, socioeconomic, and social protection related variables were included as covariates. The demographic variables include respondents age (<30, 31–40, and >40 years), current marital status (married/cohabiting and not married – not married include single, separated, divorced, and widowed), household size (2–3, 4–5, and 6+), and household head (female-headed, and male-headed). The socio-economic variables include education (no-education, primary, and secondary or higher), current engagement in income generating activities (IGAs) (yes or no), and wealth index (poor, middle, and rich). The wealth index, a composite measure of household living standard, is calculated using household's ownership of selected assets, such as chair or table, television, and electricity; materials used for housing construction – wall, floor, and roof materials; types of drinking water sources and toilet facilities (improved or not); and household income [20]. Wealth index places individual households on a continuous scale of relative wealth; we categorized it into three – poor, middle, and rich. Social protection – recipient of food or cash assistance from government of non-governmental organizations – is categorized as yes or no.

2.4. Data collection

Standard and validated questionnaires were used to collect data. The questionnaire is developed in English and translated into Amharic (widely used local language in the study areas) for ease of understanding by both the data collectors and the respondents. The questionnaire was pretested prior to the actual data collection; ambiguous and inconsistent questions were identified and modified accordingly. The final questionnaire was designed into digital data collection platform, KoboCollect.

Data collectors and supervisors were recruited based on their educational qualifications (at least first degree in relevant field of study) and previous experience in undertaking similar surveys. The survey team was given 3-day training to familiarize them with the objective of the study, the survey questionnaire, the use of digital data collection devices, and research ethics. Then they have conducted mock interviews among themselves to practice the survey instruments followed by a pilot survey before the actual deployment to the field. During data collection, each questionnaire has been checked for completeness and consistency on a daily basis. The data submitted to the server were monitored by the research team throughout the survey implementation period. The data collection was undertaken during March 16–31, 2022.

2.5. Data analysis

Prior to analysis, the data was screened for missing values, outliers, and values out of range, and the necessary actions were taken. We used proportions and charts to describe the categorical data and present the household food insecurity status. To present the quantitative data, we used median and interquartile range (IQR). Then, we conducted a bivariate analysis between the outcome variable and the covariates. Covariates found to be significant at 10 % level in the bivariate chi-square test of association are included in the multivariable model. The outcome variable, household food insecurity status, is an ordered variable (with categories - food secure, mildly food insecure, moderately food insecure, and severely food insecure) and thus we used ordinal logistic regression model (proportional odds model) to describe the relationship between the household food insecurity status and the covariates. Collinearity

between the covariates were evaluated using variance inflation factor (VIF) and found to be non-substantial (VIF <3). The proportional odds assumption was tested using the Brant method and the result is non-significant (p-value >0.1) as desired. The model goodness-of-fit was assessed using the ordinal version of Hosmer-Lemeshow (HL) tests using a 'ologitgof' STATA command and found to be a good-fit (p-value >0.1) [21]. We reported the Odds Ratio (OR) together with their 95 % Confidence Interval (CI) for the final model. Variables with p-value <0.05 in the final model were considered statistically significant and interpreted. The STATA software package version 14 was used for the data analysis.

Ethical clearance was obtained from the Institutional Review Board of College of Social Sciences, Addis Ababa University (CSS/2014/2021/306). All the study participants were informed about their voluntary participation, and verbal informed consent was obtained.

3. Results

3.1. Background characteristics

Female headed households constitute 15.9 % of the sample. The median age of the respondents was 35 years (IQR: 32–41); half of them were in the 30–40 age category. A fifth of the respondents have no education, 73.5 % were married or cohabiting, and 57.8 % were engaged in IGAs (the majority were working as unskilled laborers (43.2 %) followed by 29.4 % run their own business and 10.2 % skilled manual). The average household size was 5 (IQR: 4–6); and 3.6 % of the respondents reported receiving food or cash assistance from governmental or non-governmental organizations. From the bivariate analysis, household head, respondents, educational level, marital status, engagement in IGAs, household size and wealth index were significantly associated with household food insecurity status at 10 % level of significant (Table 1).

3.2. Level of food insecurity

The chart depicts the food security prevalence. Accordingly, 92.4 % (95 % CI: 90.2–94.6 %) of the households were food insecure – mild to severe food insecurity; 33.6 % (95 % CI: 29.7–37.4 %) were severely food insecure (Fig. 2).

3.3. Coping mechanisms during food shortage at home

As a coping strategy during food shortage, majority of the respondents reported that they would go for cheaper and low-quality

Table 1
Percent distribution of the respondents and household characteristics and bivariate association between the characteristics and household food security status, Addis Ababa, 2022.

Characteristics	N	n (%)	Household food insecurity status [n (%)]				p-value
			Food secure	Mildly food insecurity	Moderately food insecurity	Severely food insecurity	
Household head	578						0.079
Female		92 (15.9)	4 (9.1)	6 (8.2)	51 (19.1)	31 (16.0)	
Respondents age [Median (IQR)]	575	35 (32–41)					0.151
Below 30		133 (23.1)	8 (18.2)	23 (31.5)	63 (23.7)	39 (20.3)	
30–40		295 (51.3)	21 (47.7)	28 (38.4)	137 (51.5)	109 (56.8)	
Above 40		147 (25.6)	15 (34.1)	22 (30.1)	66 (24.8)	44 (22.9)	
Marital status	578						0.006
Married/Cohabiting		425 (73.5)	34 (77.3)	61 (83.6)	204 (76.4)	126 (65.0)	
Respondents' education	578						0.004
No education		117 (20.2)	9 (20.5)	12 (16.4)	43 (16.1)	53 (27.3)	
Primary		256 (44.3)	12 (27.3)	33 (45.2)	122 (45.7)	89 (45.9)	
Secondary or higher		205 (35.5)	23 (52.3)	28 (38.4)	102 (38.2)	52 (26.8)	
Engaged in IGAs	578						0.004
Yes		334 (57.8)	26 (59.1)	37 (50.7)	139 (52.1)	132 (68.0)	
Household size [Median (IQR)]	578	5 (4–6)					0.017
2–3		89 (15.4)	8 (18.2)	9 (12.3)	32 (12.0)	40 (20.6)	
4–5		304 (52.6)	15 (34.1)	45 (61.6)	149 (55.8)	95 (49.0)	
6 or more		185 (32.0)	21 (47.7)	19 (26.0)	86 (32.2)	59 (30.4)	
Receive food/cash assistance	578						0.657
Yes		21 (3.6)	3 (6.82)	2 (2.7)	10 (3.8)	6 (3.1)	
Wealth index	577						<0.001
Poor		192 (33.3)	5 (11.4)	20 (27.8)	85 (31.8)	82 (42.3)	
Middle		193 (33.4)	15 (34.1)	19 (26.4)	90 (33.7)	69 (35.6)	
Rich		192 (33.3)	24 (54.6)	33 (45.8)	92 (34.46)	43 (22.2)	

p-values are based on Chi-squared test of association; column percentages are calculated.
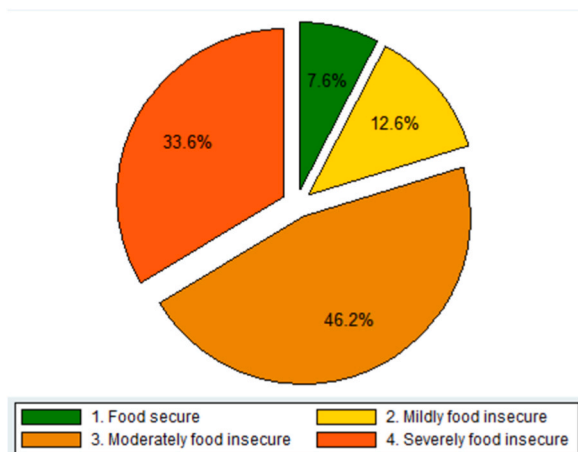
Fig. 2. Prevalence of food insecurity, Addis Ababa, 2022.

food, followed by reducing the quantity and meal frequency (Fig. 3).

3.4. Determinants of household food insecurity

Education is positively associated with food security; respondents with no education were 64 % (OR = 1.64; 95 % CI: 1.01–2.67) more likely to have the worst food insecurity status compared to their secondary and above-educated counterparts. Engaging in IGAs increased the risk of food insecurity; the risk of experiencing worse food insecurity status was 56 % (OR = 1.56; 95 % CI: 1.13–2.15) higher among respondents engaged in IGAs during the survey period compared to those who were not. The wealthier the household, the better the food security status. Compared to rich households, poor households were 2.11 times (OR = 2.11; 95 % CI: 1.39–3.22) and middle households were 1.74 times (OR = 1.74; 95 % CI: 1.18–2.56) more likely to report the worst food insecurity status (Table 2).

4. Discussion

We conducted a community-based cross-sectional survey to estimate the extent of food insecurity and to identify its determinants among low-income households in Addis Ababa, Ethiopia. We found that 92.4 % (95 % CI: 90.2–94.6 %) of the respondents were food insecure. Of these households, 33.6 % (95 % CI: 29.7–37.4 %) were in severe food insecurity status. As a coping strategy during food shortage, most of the households reduced either the quality or quantity of food they usually consume. We also found that respondent's education, working status, and household wealth were independently associated with food insecurity.

We observed a high prevalence of food insecurity in our study. For example, during high food price inflation, one study reported a food insecurity prevalence of 75 % [6], while another study conducted among urban Productive Safety Net Program beneficiaries
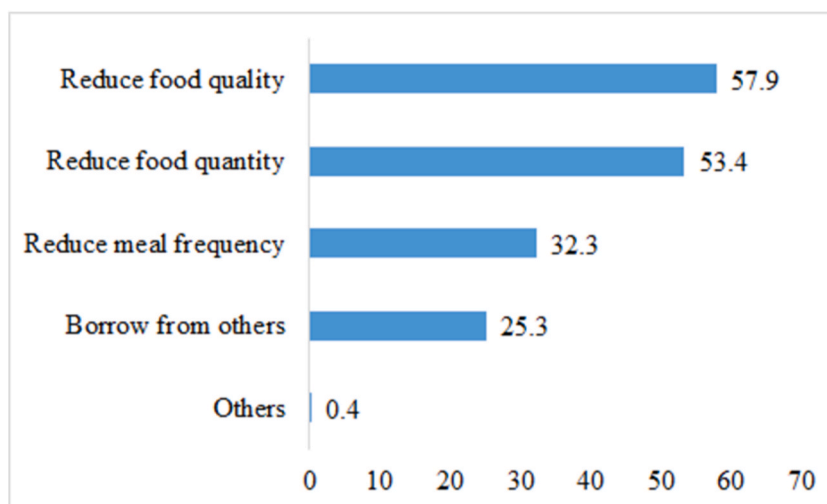

Fig. 3. Percentage distribution of coping mechanisms used by households during food shortage, Addis Ababa, 2022.

Table 2
Ordinal logistic regression result for the determinants of household food insecurity status.

Covariates	OR	95 % CI	p-value
Household head			
Female	1.02	(0.65; 1.59)	0.928
Male (Ref.)	1.0		
Respondents' education			
No education	1.64	(1.01; 2.67)	0.045
Primary	1.41	(0.98; 2.01)	0.063
Secondary or higher (Ref.)	1.0		
Current marital status			
Married/Cohabiting	0.66	(0.44; 1.00)	0.052
Not married (Ref.)	1.0		
Household size category			
2–3 (Ref.)	1.0		
4–5	1.01	(0.61; 1.67)	0.960
6 or more	0.87	(0.52; 1.47)	0.605
Engaged in IGAs			
Yes	1.56	(1.13; 2.15)	0.007
No (Ref.)	1.0		
Wealth index			
Poor	2.12	(1.39; 3.22)	<0.001
Middle	1.74	(1.18; 2.56)	0.005
Rich (Ref.)	1.0		

(households that are poor and chronically food insecure) reported a prevalence of 77.1 % [7]. A similar study conducted in the urban setting in Oromia region of Ethiopia showed household food insecurity prevalence of 59.6 % [8]. Two main reasons worth mentioning for the observed high prevalence of food insecurity in our study.

First, our study was conducted among the poorer segment of the population where the majority's livelihood was dependent on either casual laborers or self-employment, both of which are heavily affected by the COVID-19 pandemic [9,11]. Although job losses and a decline in household income have been reported during the onset of the pandemic (five months into the pandemic), especially among the poorer households in Addis Ababa [10,12], it did not affect the food security situation at the beginning [10]. This is partly due to the measures that the Addis Ababa city administration has taken during the onset of the pandemic, including establishing food banks where the poor receive food or money, mobilizing individuals to provide a meal matching their own meal to vulnerable populations through 'Each One Feed One National Challenge', banning rental increases of residential houses and eviction of tenants, food price control, importation of food free of tax, purchase of stockpile of food and essential goods [9,12,13]. Furthermore, households may have used their savings during the shock and redirected other expenses towards food items. However, as time goes by, the intensity of intervention measures declined, and household savings dried out leading households fall into food insecurity. As a testimony, in early 2021, 63.4 % of residents in Addis Ababa reported a decrease in household income due to COVID-19 pandemic and 34.3 % of them faced food shortages mainly due to income decline (45 %) and food price inflation (32 %) [11].

Second, high price inflation. Increased government spending due to the conflict in northern Ethiopia, foreign exchange fluctuations, petroleum price hikes, and disruptions in the food value chain – production, transportation, and marketing induced by the pandemic and Ukraine-Russia conflict have aggravated the inflation level in the country [9,13,22,23]. As a result, national food price inflation has reached its pick of 43.4 % during March 2022 compared to the same month a year before [22]. Food price inflation leads to severe food access constraints for low-income and vulnerable households because a large share of their income (up to 75 %) is dedicated to food items [5], and food types they spend more, such as cereals, have risen most in price [22].

We also observed that, during food shortages, households are often forced to reduce the quality and quantity of their food. While these coping strategies are commonly practiced mechanisms in Ethiopia and elsewhere [6,12,23,24], they can increase the risk of malnutrition and its consequences. These consequences include poor health and cognitive development, low economic productivity, increased proneness to overweight and obesity and associated non communicable diseases [5,25].

Households of non-educated respondents were more likely to experience food insecurity. Our findings suggest that most non-educated respondents were either unskilled laborers or had no jobs and were already vulnerable to poverty. Their livelihoods are mostly dependent on unpredictable income and the readiness of the economy to accommodate them. Unfortunately, due to the pandemic impact (economic slowdown) and inflation in the country, obtaining substantial income-generating jobs for them is challenging. This may have contributed for the reported high food insecurity. Our findings are substantiated by other studies [6,7,26] where education averted the risk of household food insecurity.

The risk of food insecurity was higher among those who engaged in IGAs. While paid employment has long been considered as the primary means of improved livelihood, the income generated may be insufficient to maintain a reasonable standard of living [27]. This 'working poor' or 'in-work poverty' can be explained by the kind of jobs the respondents engaged in (having a job that does not guarantee a decent living conditions). The majority of those who engaged in IGAs were unskilled laborers or self-employed, which are low-paying jobs that have been hard-hit by the pandemic impact, inflation, and conflict-induced challenges [9,11]. Furthermore, the respondents may have shifted their permanent and better-paying jobs to these temporary and low-paying jobs due to pandemic induced job losses [9]. As a result, their job might not bring decent income and they might be using their savings, if any. It is

documented that individuals working in unstable environments, such as the informal sector, or in low-skilled occupations are more likely to fall into working poverty [27]. Therefore, income generation by itself is not a guarantee to ensure household food security unless the economic situation is balanced in terms of income and the existing cost of living. Our findings contradict other study results where employment and income are positively associated with food security [6,24,26]. Given that the urban poor rely solely on the market for their food supply, they require stable income and affordable food prices to ensure their food security is met.

Our study substantiates the argument that food security status and household wealth are positively associated; as household wealth increases, so does access and continuous utilization of food. The restriction measures due to the pandemic and food price inflation particularly affected poor households and further deteriorated their already vulnerable food security situation [9,23,24]. Marital status, household size and household head were found to be significantly associated with food insecurity status in the bivariate analysis. However, when we controlled for confounding variables in the ordinal logistic regression, the association was no longer statistically significant.

This study has some limitations. Although the HFIAS questions are validated in the Ethiopian context [19], the impact of social desirability bias (look good to others) cannot be ruled out. Our study focused on household food insecurity among low-income households [15,17] and thus cannot be generalized to the entire Addis Ababa. Due to the cross-sectional nature of the study, it is not possible to establish a causal relationship between food insecurity and the pandemic impact.

In conclusion, the extent of food insecurity among low-income households in Addis Ababa is very high (more than 9 out of 10 were food insecure). Households were forced to reduce food quantity and quality to cope with the food shortage. Respondent's education, engagement in IGAs, and household wealth were independently associated with household food insecurity. Although supporting people living below the poverty line (pro-poor) remains the top priority of public or social protection programs, adapting the program to accommodate the 'working poor' or 'in-work poverty' is crucial, especially during shocks. For example, supporting the informal sectors and casual workers through urban safety net scheme would protect the livelihoods of the poor and help them survive the food insecurity crisis in the short term. In the long term, building the wealth base of the society would enhance their resilience capacity to withstand shocks.

Ethical approval

Ethical clearance was obtained from the Institutional Review Board of College of Social Sciences, Addis Ababa University (CSS/2014/2021/306).

Consent to participate

Verbal informed consent was obtained prior to the interview.

Data availability statement

Data included in the article and supplementary material.

CRediT authorship contribution statement

Tefera Darge Delbiso: Writing – original draft, Visualization, Validation, Software, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Fekadu Mulugeta Asfaw:** Writing – review & editing, Supervision, Resources, Investigation. **Tibebu Moges:** Writing – review & editing, Supervision, Methodology, Data curation. **Debebe Ero:** Writing – review & editing, Supervision, Resources, Funding acquisition. **Messay Gebremariam Kotecho:** Writing – review & editing, Supervision, Resources, Project administration, Investigation, Funding acquisition.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.heliyon.2024.e29633.

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