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# Household food insecurity and associated factors among households in Wolaita Sodo town, 2015

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## Abstract

**Background:** Culturally, food insecurity is expected in rural households. But it is considerable in urban setting due to many factors. Yet this has been hardly recognized in the study area. Therefore, this study intended to assess the level of household food insecurity and associated factors among households in Wolaita Sodo town, Southern Ethiopia, 2015.

**Methods:** A cross-sectional study was conducted in Wolaita Sodo town. Overall, 609 households were selected from the town by multistage sampling. Data were collected using pretested and structured tool through interviewing household heads. Household food insecurity access was assessed with Household Food Insecurity Access Scale questions. Data were analyzed using SPSS version 16 statistical package. All descriptive statistics were performed by univariate analysis. Bivariate analyses were also performed to identify crude predictors of household food insecurity, and finally, multivariable logistic regression was used to develop final model indicating the predictors of outcome variable.

**Results:** Based on the findings of this study, about 37.6% households were food insecure. Of those households, 10.8% were mildly food insecure, 23.2 and 3.6% households were moderately and severely food insecure, respectively. Factors associated with household food insecurity were marital status (single household head) (AOR 4.06 at 95% CI 1.24, 13.27), greater than two dependent members (AOR 3.03 at 95% CI 1.38, 6.63), households headed with daily laborers (AOR 16.0 at 95% CI 4.57, 56.03), higher monthly income (AOR 0.013, at 95% CI 0.004, 0.05) and low monthly food expenditure (AOR 10.56 at 95% CI 2.61, 42.71) in the study area.

**Conclusions:** Household food insecurity was high in the study area compared to urban national level. Being single household head, having more than two dependent members in the household, daily laborers of household head and low monthly food outlay had statistically significant relationship with household food insecurity in negative direction. On the other hand, higher monthly income was significantly associated variable with household food insecurity in affirmative track. So, findings appoint as attention needed on stabilization of food markets, designing urban household food insecurity strategies and creating job opportunities to improve household food security in the setting.

**Keywords:** Associated factors, Household food insecurity, Household head, Wolaita Sodo town

## Background

Adequate food in terms of quantity and quality for all people at all time is vital to a nation growth. Lack of

food in long terms leads to hunger and starvation [1]. Indicators of food security include availability of food, economic and physical access to food, adequate food utilization and sustainably having access to adequate food [2]. Food insecurity exists when all people, at all times, lack secure access to sufficient amounts of safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life [3, 4]. During food

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insecurity, people are not consuming enough food for an active and healthy life. This perhaps due to the unavailability of food, inadequate purchasing power or inappropriate utilization at household level [4].

Household food insecurity can be chronic and transitory in its type. Chronic food insecurity is often the result of extended periods of poverty, lack of assets and inadequate access to productive resources. Transitory household food insecurity is primarily caused by short-term shocks and fluctuations in food availability and food access, including year-to-year variations in domestic food production, food prices and household income [2, 5]. Ethiopia is a country that has a long history of household food security braves linked to rural households now facing new challenges related to urban setting [6, 7].

Household food insecurity is one of major public health problems in both developing and developed nations [4]. Based on Food and Agricultural Organization (FAO) report, 805 million (11.3%) global populations were unable to meet their dietary energy supplies in 2012–2014. In developing countries, 791 million people live in hunger, which means 13.5% of the overall population remain tirelessly underfed [8]. Achieving food security for all people at all times remains a huge challenge for several developing countries. Ethiopia is one of the world poorest countries with needles suggesting low levels of progress, and it has been plagued with food insecurity for decades. Yet, food security appraisals in Ethiopia have traditionally focused on rural areas, and urban food security problems have got little attention [9].

According to the interim report of poverty analysis, the proportion of population below poverty line in urban area were 25.7%, while the proportion of food poor people in urban area were estimated to be 28%. That shows, over 1:4 Ethiopians fell below poverty line in urban settings [10]. Based on Household Consumption Expenditure (HCE) data of Ethiopia, at a national level, about half (49%) of total household expenditures were on food for households. The level was higher in rural Ethiopia (51%) than urban (41%). Households who spend more than 65% of their expenditures on food are considered to have a high share of food expenditure [11]. Besides, studies done in different parts of Ethiopia revealed the main predictors of household food insecurity as: household incomes, occupation and educational status of household heads, household/family size, age of household head, access to credit, access to employment, proportion of expenditure on food and marital status of the household [1, 6, 12].

Urbanization and/or urban migration resulted in alarming population pressure implying increased food demand. Food accessibility and affordability are considered to be the main factors for household food insecurity in urban setting. In addition, poverty, irregular

household incomes, unemployment, dynamic and complex livelihoods are the root cause of urban household food insecurity. But, household food insecurity status at urban setting of Wolaita Sodo town was not inclusively studied. Therefore, this study was conducted at Wolaita Sodo town as benchmark to provide valuable information for stakeholders.

## Methods

### Study setting

The study was conducted in Wolaita Sodo town in Wolaita zone, Southwest Ethiopia. This locality is one of 13 zones in SNNPR located in southern part of the country at 385 km from Addis Ababa and 165 km southwest of the regional capital, Hawassa. Sodo Town is the capital city of Wolaita zone and located in 6°48′–6°53′N latitude, 37°44′–37°46′E longitude and at the altitude of 1500–2500 m. This town covers about 82.1 km<sup>2</sup>, and the total population is estimated to be 110,657 (57,477 males and 53,180 females). According to Wolaita Sodo town health office report, the total number of households in the town was seen as 22,584 in 2015. This settlement is structured in three sub-cities and 11 administrative kebeles. There are two hospitals, three health centers, 11 health posts and >21 private health institutions providing health services. Households produce their livelihood by civil services, non-government organizations employ, trading, small-scale industries, daily laborers, pension, etc.

### Study period, design and populations

The study was conducted from August 6, 2015, to August 31, 2015, and a community-based cross-sectional study design was carried out. All household's head in Wolaita Sodo town and all randomly selected household heads in selected villages within the town were source and study populations. Besides, all household heads that were resident in Wolaita Sodo town for the past 6 months were included, and those who were not able to speak were excluded.

### Sample size determination and sampling procedures

A single population proportion formula was used with the following assumptions: the level of urban food insecurity at Addis Ababa (58.2%) [1], absolute precision (5%), confidence limit (95%) and design effect (1.5) for this study. Thus, the calculated sample size was 617 with eventuality for none response (10%). Out of 11 kebeles in Wolaita Sodo town, five kebeles were selected by simple random sampling (SRS). Then, 15 villages were still selected by SRS from the list of 45 villages in selected five kebeles. Finally, to each village sample was allocated proportionally and households were selected by systematic random sampling method.

*Dependent variable* Household food insecurity.

### Independent variables

*Sociodemographic factors* Sex of household head, family size, age of household head, marital status of household head, educational status of household heads, ethnicity, religions, dependent members in households and occupation of household head.

*Socioeconomic factors* Monthly household incomes, access to credit, house ownership, and proportion of expenditure on food.

### Operational definitions

*Food insecurity* Exists when all people, at all times, lack secure access to sufficient amounts of safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

*Mildly food insecure (access) household* Worries about not having enough food sometimes or often and/or is unable to eat preferred foods.

*Moderately food insecure household* Sacrifices quality more frequently, by eating a monotonous diet or undesirable foods sometimes or often.

*A severely food insecure household* Experience forced cutting back on meal size or number of meals often, and/or experiences any of the three most severe conditions.

### Data collection method used for this study

Data were collected using pretested and structured questionnaire. Household Food Insecurity Access Scale (HFIAS) developed by FANTA and validated for urban setting by Seifu Hagos at Butajira town was used [13]. Moreover, 12 food groups suggested by FANTA using a 24-h recall method were used to assess Household Dietary Diversity Score (HDDS) [13–15]. Questionnaire was initially prepared in English and translated to Amharic and finally back translated to English to check consistency and accuracy by language experts. Five diploma graduate nurses as data collector and two BSc public health professionals were recruited from Sodo town as supervisor based on their previous experience.

### Data quality assurance

Enumerators and supervisors were trained for 2 days, 1 week prior to date of data collection on: study objectives, key highlights in methods to assess household food insecurity, data collection and interviewing approach, and data recording. Pretesting was done on 5% (31 households) of the sample from two kebeles, which were not selected for actual study. Data collection was strictly supervised in daily basis. Data were then checked for completeness and consistency before data entry. Data were entered in Epi Info version 3.5.3. Then, data were

exported to SPSS version 16 for further data processing and/or analysis.

### Data processing and analysis

Households were classified based on responses to the nine severity items in the HFIAS and coded “0” for “No” and “1” for “Yes.” The procedure for scoring was used as follows: “0” was attributed if the event described by the question never occurred, “1” if it occurred during the previous 30 days. With regard to the occurrence, “1” was attributed if the events rarely occur, “2” sometimes and “3” often. Therefore, responses on the nine HFIAS questions were summed using the SPSS 16 program to create household food security score, with a minimum of “0” and a maximum score of “27.” According to the score, the higher the score, the more the household is vulnerable to food insecurity. The lower the score, the lesser the food insecurity a household experienced. Therefore, HFIAS score of 0–1 is categorized as food secure, 2 and above were considered as food insecure. Households scored 2–7, 8–14 and 15–27 were categorized to be mildly, moderately and severely food insecure households, respectively.

Descriptive statistics like frequencies, proportions, mean, graph and table were used to present study results. Bivariate and multivariable logistic regressions were computed to assess the association between the study variables and to control possible confounders. All variables with  $P$  value  $\leq 0.25$  were selected as candidate for multivariable analysis.  $P$  value  $< 0.05$  was used as yardstick to judge the association as statistically significant. Both crude (OR) and adjusted odds ratio (AOR) with 95% confidence interval were reported to show the strength of association between study variables.

## Results

### Sociodemographic and socioeconomic characteristics of households

A total of 609 households participated in this study with the response rate of 98.7%. The mean (SD) age of household head was 43.03 (9.77) years, and 488 (80.1%) household heads included were males. Larger segment of participants 479 (78.7%) was married, and about 402 (66%) households have 4–6 family members. Besides, households with  $\leq 2$  dependent members were 422 (69.3%), and household heads attended formal education were 425 (69.8%). In terms of livelihood, among household heads included, 321 (52.7%) were self-employed and 308 (50.6%) gain monthly income of  $>1901$  ETB/87 USD. The extent of households reporting ownership of assets can be described for mobile phone 536 (88%), TV/DVD/Radio 485 (79.6%) and modern bed 402 (66.0%) from principally available assets. Few households reported

possession of the following wealth: car 9 (1.5%), bicycle 54 (8.9%), refrigerator 149 (24.5%), jeweler 191 (31.4%), sofa set 219 (36.0%) of the participants (Table 1).

#### Access to food and food consumption in Wolaita Sodo town, 2015

All households included in this study purchase their food primarily from market. Almost half of households used  $\geq 1201$  ETB/55 USD for food expenses, and 124 (20%) of the households reported eating  $\leq 2$  meals per day. Majority of the households 582 (95.6%) consumed cereals as their staple food over 24 h prior to this survey. Additionally, 557 (91.5%) households consumed vegetables, 482 (79.1%) oils or fats, 587 (96.4%) miscellaneous (tea and coffee), 455 (74.7%) sugar or honey, 401 (65.8%) pulses, 331 (54.4%) roots or tubers, 9 (1.5%) fish, 42 (6.9%) meat,

82 (13.5%) egg, 169 (27.8%) fruits and 176 (28.9%) milk and milk products over 24 h prior to the survey.

#### Household Dietary Diversity Score and prevalence of household food insecurity in the study area

The mean (SD) dietary diversity score of households was found as 6.36 ( $\pm 1.36$ ), and households were labeled to three groups by using this mean score. Over 160 (26.3%) households were located at poorly diverse dietary consumers (who consume  $\leq 5$  food groups), 288 (47.3%) households at medium dietary diversity (who consume 6–7 food groups) and 26.4% of households are classified in betterly diverse dietary consumers (who consume  $> 7$  food groups) accordingly. Among the participants, 229 (37.6%) responded affirmatively to the nine occurrence questions, labeling them as food insecure households. Based on set cutoff points, 66 (10.8%) households classified as mildly food insecure. Households classified as moderately and severely food insecure were 141 (23.2%) and 22 (3.6%), respectively (Fig. 1).

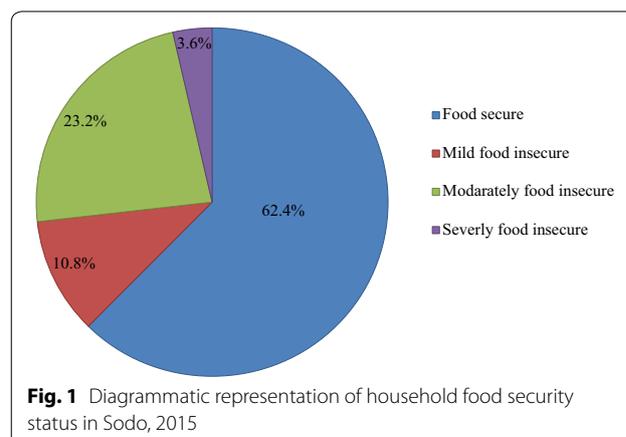
The study finding reveals as 227 (37.3%) households worried food inaccessibility and 229 (37.6%) households were not able to eat the kinds of food they preferred due to lack of resources. Moreover, about 226 (37.1%) households reported that they did not consume a variety of food they prefer, 173 (28.4%) ate unwanted food, 200 (32.8%) ate small amount meal and 168 (27.6%) ate few meals per day. The proportion of households who experienced lack of food to eat was 44 (7.2%) and going to bed without eating were 25 (4.1%) based on the findings of this study (Table 2).

#### Domains of household food insecurity in Wolaita Sodo town

The nine occurrence items can further be summarized into three major domains: (I) feelings of uncertainty or anxiety about the household food supplies (represented by item 1), (II) perceptions that household food is of

**Table 1 Sociodemographic characteristics of the respondents in Sodo town, 2015**

Variable N = 609	Category	Frequency	%
Sex of HH head	Male	488	80.1
	Female	121	19.9
Age of HH head	20–40	286	47.0
	41–64	287	47.1
	65 and above	36	5.9
Family size	1–3	66	10.8
	4–6	402	66.0
	7 and above	141	23.2
Religion	Orthodox	295	48.4
	Protestant	274	45.0
	Others	40	6.6
Ethnicity	Wolaita	411	67.5
	Amhara	66	10.8
	Gurage	47	7.7
	Gamo	64	10.5
	Others	21	3.5
Marital status of HH head	Married	479	78.7
	Unmarried	6	1.0
	Divorced	26	4.3
	Separated	13	2.0
	Widowed	85	14.0
Educational status	No formal education	184	30.2
	Formal education	425	69.8
Occupation of HH head	Self-employed	321	52.7
	GOV/NGO employed	120	19.7
	Daily wage	115	18.9
	Pension	53	8.7
Monthly income	$\leq 1000$	184	30.2
	1001–1900	117	19.2
	$\geq 1901$	308	50.6



**Fig. 1** Diagrammatic representation of household food security status in Sodo, 2015

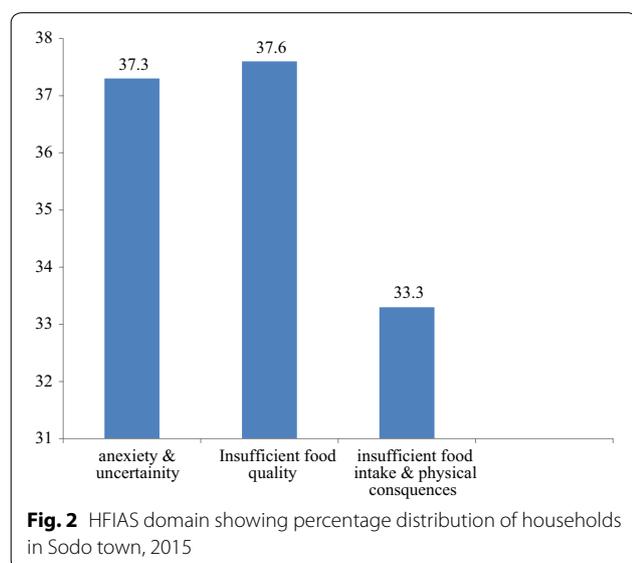
**Table 2 Occurrence of HFIAS conditions in Sodo town, 2015**

Indicator	No N (%)	Total (yes) N (%)
Worry about not having enough food?	382 (62.7)	227 (37.3)
Unable to eat preferred food	380 (62.4)	229 (37.6)
Eat just a few kinds of food	383 (62.9)	226 (37.1)
Eat food really do not want	436 (71.6)	173 (28.4)
Eat smaller amounts in meal	409 (67.2)	200 (32.8)
Eat fewer meals in a day	441 (72.4)	168 (27.6)
No food of any kind in household	565 (92.8)	44 (7.2)
Go to sleep hungry at night	584 (95.9)	25 (4.1)
Go a whole day and night without food	604 (99.2)	5 (0.8)

insufficient quality and food type preference (signified by items 2–4), and (III) insufficient food intake and its physical consequences (items 5–9). The computed percentage for anxiety and uncertainty domains was 227 (37.3%), for the insufficient food quality domain 229 (37.6%) and insufficient food intake and its physical costs domain was 202 (33.3%) in the study area (Fig. 2).

#### Factors associated with household food insecurity in Wolaita Sodo town

The candidate variables selected for multivariable logistic regression were: sex of household head, age of household head, family size, marital status, dependent member, occupation, monthly income, food expenditure, house ownership and credit access. Variables retained their statistical significance in multivariable model were: marital status, dependent member in household, occupation, monthly income of household and monthly food



expenditure. Households headed with single (unmarried, separate, divorced and widowed) were 4.0 times more likely to be food insecure compared with married (AOR 4.06 at 95% CI 1.24, 13.27). Households with >2 dependent members were 3.0 times (AOR 3.03 at 95% CI 1.38, 6.63) more likely to be food insecure than  $\leq 2$  dependent member in households. Household heads who were daily laborers were 16 times (AOR 16.0 at 95% CI 4.57, 56.03) more likely to be food insecure when compared with self-employed. The results also show that households gaining higher monthly income (>1901 ETB) were 98.7% (AOR 0.013 at 95% CI 0.003, 0.051) less likely to be food insecure compared to lower monthly income (<1000 ETB). Households expending  $\leq 700$  ETB for monthly food utilization were 10.5 times (AOR 10.56, 95% CI 2.61, 42.71) more likely to be food insecure than with households who expend  $\geq 1201$  EB (Table 3).

#### Discussion

This study looked at the level and associated factors of household food insecurity in an urban area of Sodo town using validated HFIAS. A total of 37.6% households were food insecure (10.8, 23.2 and 3.6, mildly, moderately and severely food insecure, respectively). The study showed that single household head, dependent member in household, daily laborer household head, monthly income and monthly food expenses were significant predictors of household food insecurity in the study area.

The state of household food insecurity (37.6%) identified in this study was analogous with studies done in Shashemene (36%), Kenya (38%) and national report (35%) [16–19]. However, it was lower than findings reported by studies conducted in South Delhi and Malda district of India (77.2 and 68.38%), Kinshasa (70%), Addis Ababa city (75 and 58.2%), Dire Dawa town (43%), Farta district (70.7%), Manna district (42.9%), Offa district (57%) and Boloso Sore district (65.5%) [1, 4, 6, 12, 20–26]. The possible reason to variation might be the coincidence of the data collection with a harvest season, where food is more available and the prices are relatively low. Thus, lower household food insecurity in this study might be associated with harvesting season of the year where the study was performed. In contrary, the finding observed in this study tends to be higher than the findings of some studies such as Pakistan (19%), Humbo (28.4%) and urban areas of Ethiopia (28.0%) [10, 27–29]. The disparity might be due to the agroecological differences in settings and socioeconomic variations among study areas.

The finding expressed as single household heads were 4 times more likely to be food insecure than married households was similar to findings of studies done in South Africa and Dire Dawa [12, 30]. This might be owing to less family income and low purchasing power.

**Table 3 Bivariate and multivariable analysis on factors associated with household food insecurity**

Variable (n = 609)	Food security status		COR (CI)	AOR (CI)
	Insecure	Secure		
Sex of HH				
Female	79	42	4.24 (2.78,6.45)	1.30 (0.39,4.28)
Male	150	338	1	1
Age of HH				
20–40	89	197	1	1
41–64	114	173	1.45 (1.03,2.05)	0.14 (0.01,1.28)
65 and above	26	10	5.75 (2.66,12.44)	0.73 (0.09,5.76)
Family size				
1–3	34	32	1	1
4, 6	149	53	0.55 (0.33,0.94)	0.77 (0.34,1.74)
7 and above	46	95	0.45 (0.25,0.82)	0.93 (0.37,2.35)
Marital status				
Singles	86	44	4.59 (3.0,6.93)	4.06 (1.24,13.27)**
Married	143	336	1	1
Dependent				
>2 members	83	104	1.51 (1.06,2.14)	3.08 (1.33,7.13)**
≤2 members	146	276	1	1
Occupation				
Pension	43	10	19.92 (9.45,41.96)	5.27 (1.49,18.58)*
Daily wage	108	7	71.46 (31.6,161.64)	16.0 (4.57,56.03)**
Gov/NGO employed	21	99	0.98 (0.57,1.71)	5.26 (2.05,13.47)**
Self-employed	57	264	1	1
Education				
No formal education	102	82	2.92 (2.04,4.17)	1.33 (0.76,2.32)
Formal education	127	298	1	1
Monthly income				
≤1000 birr	169	15	1	1
1001, 1900 birr	49	68	0.064 (0.034,0.122)	0.15 (0.049,0.449)**
≥1901 birr	11	297	0.003 (0.001,0.007)	0.01 (0.003,0.051)**
Food expenditure				
≤700	159	17	211.7 (96.6,463.74)	10.56 (2.61,42.71)**
701–1200	59	69	19.3 (9.77,40.13)	5.83 (2.20,15.42)**
≥1201	11	249	1	1
House ownership				
Rent house	150	115	4.38 (3.09,6.21)	1.04 (0.48,2.23)
Private owner	79	265	1	1

P value <0.05\* significantly associated, P value <0.01\*\* strongly statistically significant

Moreover, households with >2 dependent members were 3 times more likely to be food insecure than households with ≤2 dependent members. The higher the number of dependents in the household, the lower the income generated to purchase food items to fulfill all family needs. Thus, a lower household income and increased family size tend to worsen household food insecurity. The findings from related studies done in Zimbabwe, Humbo and Sodo town agree with this finding [19, 27, 31, 32]. The study also revealed as daily laborers were 16 times more likely to be food insecure compared to self-employed. This may be due to low income, social security and purchasing power of the daily laborers. Pensions were also the most affected because their income was small and experience higher food prices. However, self-employed were able to toil multiple works and compensate partly the high food prices. It was comparable with study conducted in Addis Ababa, Bangladesh and India [6, 21, 33].

Households who reported higher monthly income were less likely to be food insecure than relatively smaller income gainers. Researches done in South Africa, Addis Ababa city and Dire Dawa also shown that households with higher monthly income were less likely to suffer from household food insecurity than households with lower incomes [6, 12, 30]. Regarding to food expenditure, households expending ≤700 ETB for monthly food purchase were 11 times more likely to be food insecure than those households who expend more. The finding was like studies done in North India and Dire Dawa [12, 21]. This could be due to low income accompanied with low purchasing power. As the proportion of expenses on food decline and access to food by household also decrease, this may end up with shortage of food variety as well as quantity.

### Limitations of the study

Data collection concerns by HFIAS (relies on the recall of events occurred in the last four weeks). Concurrence of study period with harvest season might underestimate the situation of household food insecurity in the setting. Besides, issues related to monthly income of household and expenditure (relies on report from household head) were the possible limitations of this study.

### Conclusions

The study concludes as household food insecurity is not only a rural issue but also substantial in urban settings. The findings shown as higher extent of households were food insecure in the study area than national description for similar setting (urban setting). Furthermore, single headed households, dependent members in households, daily laborer household head, higher monthly income

and low food expenditure were significant predictors of household food insecurity. Municipality, health and agriculture sector, and other stakeholders need to take action toward improving household food security state in the study area. Actions should focus on: strengthening micro-finance and small business enterprise to increase access to food via amplified income, design strategies on household food security program [e.g., Productive Safety Net Program (PSNP)]; strengthening family planning methods, stabilization of food markets/prices and income generating activities should be encouraged. Besides, backup of saving practice to ensure resilience for food insecure households is also needed. Further studies are desirable to come across seasonal variations of household food insecurity in urban setting.

#### Abbreviations

AOR: adjusted odds ratio; FANTA: Food and Nutrition Technical Assistance; HFIAS: Household Food Insecurity Access Scale; HDDS: Household Dietary Diversity Score; NORAD: Norwegian Agency for Development; SENUPH: South Ethiopian Network of Universities in Public Health.

#### Authors' contributions

AT monitored data collection and involved in analysis and report writing grossly; TD reviewed study design and data analysis and contributed in report write-up; BK reviewed data analysis and contributed in report write-up; MY\* had decisive scientific role in design, analysis, interpretation of findings and write-up. All authors read and approved the final manuscript.

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Exchange rate from ETB to USD differs from time to time. However, it was 1 USD: 22.40 ETB (One USD is equal to 22.40 ETB) at the time of data collection.

#### Competing interests

The authors declare that they have no competing interests.

#### Availability of data and materials

The datasets analyzed during the current study were available from the corresponding author on reasonable request.

#### Ethics approval and consent to participate

Ethical clearance was obtained from the ethical review committee of college of health sciences and medicine, Wolaita Sodo University. Then, concerned officials in Wolaita Sodo town at each level were communicated through formal official letters from the school of public health. The town health office provided official letter to local authorities of all selected kebeles. Informed verbal consent was obtained from each participant before interview. To ensure confidentiality of participants, anonymous coding was used whereby the name of the participants and any participants' identifier were not written on the survey note. Even during the interview time, to keep the privacy of subject's interview was carried out at private place and alone (only interviewer and respondent listens each other). Moreover, the rights of members not to take part and not to answer the query they don't want to answer were ensured.

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