

.Original Research Article

Household Food Insecurity Evidence among Rural Pastoralist community in South Omo, Ethiopia

ABSTRACT

Background: Food insecurity is a significant public health problem in developing nations particularly in Ethiopia. During COVID- 19, food insecurity has worsened as result of lock down in most part of Africa as well as Ethiopia. In this regard, several studies have been conducted in central and agrarian communities, yet there is little evidence of studies on food insecurity in pastoralist communities. Thus, the study aimed to assess the burden and factors associated with food insecurity at rural pastoralist community.

Methodology: A community-based, comparative cross-sectional study conducted among 536 households. Pre-tested and structured questionnaires were used to collect data. Data were entered in Epi info version 7 and exported to SPSS version 25 for data analysis.

Results: The overall prevalence of food insecurity in this study area was 88% [95% CI: 88.2, 91.0]. Low land agro-ecology [(AOR=3.1, 95% CI: (1.5, 6.3)], pastoralist community [AOR=3.7, 95% CI: (1.6, 8.7)], low wealth index [(AOR=2.5, 95% CI: (1.1. 3.6)], and larger family size composition which were statistically significant with food insecurity at household level.

Conclusion: The burden of food insecurity was 88% in the study area. This was substantially high level and a severe public health problem. Low wealth index, family size, and low land agro ecology were contributing factors for food insecurity. Therefore, policy makers and local administration advised to invest pastoralist income generating intervention and modernize agricultural technology to tackle food insecurity in the study area.

Key word: Burden, Evidence, Contributing Factors, Food insecurity, household, Pastoralist community

1. INTRODUCTION

Food security is ensured if sufficient nourishment (healthy, quality, quantity, socio-culturally acceptable) is “accessible and available for and acceptably used by all people consistently to carry on with a sound and joyful life”[1,2,3&4]. At the household level, food security refers to the capacity of the household to secure, either from its own production or through purchases, sufficient food to meet the dietary needs of all members of the household [5]. Food insecurity, in comparison, is a basic public health nutrition problem in Low and Middle Income Countries (LMICs) [6]. Food insecurity occurs due to lack of access to adequate, safe and nutritious food for development, physical growth and healthy life [7]. The reason for the lack might be the absence of food and shortage of resources.

Globally food insecurity report indicated that, there is a little progress in world starvation, even the figure of people who suffer from hunger has gradually increased. Thus, more than 821 million, approximately 1 out of 9 people in the world are still food insecure today [8]. In recent evidence, 9.2% of the world people, slightly more than 700million populations were exposed to severe of food insecurity in 2018[9]. In this regard, Ethiopia and South Sudan carry the highest risk with 3million people in nutrition crisis, followed by Kenya (2 million people), Somalia (731,000) and Uganda (180,000) [10]. Undernourishment and severe food insecurity appear to be increasing in almost all regions of Africa, as well as in South America [8].

Ethiopia is one of the countries in Sub-Saharan Africa, which has experienced food insecurity over long periods of time and which has one of the highest prevalence of food insecurity with more than 35% of the general population consistently food insecure. An estimated 30 million people in Ethiopia are exposed to under nourished and food insecurity [11]. About, 51% of the rural households in Ethiopia experience food insecurity, with livestock proprietorship and family size being negatively or positively related to food insecurity [12]. An estimated 10% of Ethiopian residents are consistently face food insecurity, and this number increases to 15% in dry seasons. More than 41% of the Ethiopian populations live under the breadline and more than 31million people are under nourished [13]. To this end, in 2014, an estimated 3 million individuals required nutrition crisis food interventions [14]. As indicated by Mohamed, [13] Ethiopia has been suffering with dry season, food insecurity, repeated nourishment deficiency, hunger and starvation. While, Climate change and dry seasons are the primary drivers of food insecurity, currently global developments such as COVID-19 pandemic, have exacerbated food insecurity due to the social, economic restrictions and lockdown in Ethiopia [15, 16 & 17].

In 2015, UN assembles launched new agenda for world transformation and sustainable development. These new global change plans consisted of 17 sustainable development goals (SDG) and 169 targets that will implement for 15years. Out of the 17 SDG, goal 2(end hunger and improved nutrition and promote sustainable agriculture)[18].

Food security is not only a matter for social wellbeing of families, but it is also the most prevalent public health issue in developing nations, particularly in Ethiopia. In fact, several studies have been conducted in

central and agrarian communities. However, there is little evidence of studies on food insecurity in the most remote pastoralist communities like South Omo zone. Moreover, there is a lack of community based research, pertaining to intervene and address food insecurity in pastoralist communities. Therefore, the current study objective is to assess the burden and factors associated with food insecurity in pastoralist community in South Omo zone, Ethiopia.

2. MATERIALS AND METHODS

STUDY SETTING

The research was conducted in the South Omo Zone, one of 15 zones in the Southern Nations, Nationalities and People's Region (SNNPR) of Ethiopia. The zone is divided into 10 districts and one city administration and the zone consists of 205 rural and 60 urban "kebeles" (smallest administration structure in Ethiopia). The zone capital is Jinka, a city in the southern part of the SNNPR; 434 km from the regional capital of SNNPR, Hawassa; and 800 km from Addis Ababa, the capital of Ethiopia. The Central Statistical Agency (CSA) 2019 estimated a population of 749,214 in the South Omo Zone, accounting for nearly 4% of the total population of the region, with 359,623 and 389,591 of men and women, respectively. An estimated 152,900 of the population was a household in the zone [19].

As indicated by South Omo Zone Finance and Economic Development Annual Report [20], the Zone has a diverse agro-ecology, ranging from hot arid to tropical humid. The high land constitutes 0.5 percent of the Zone, midland 5.1 percent, "mid-low land" 60 percent, and low land 34.4 percent [20]. The major food crops produced in the Zone are maize, sorghum, "teff" (type of cereal), coffee, vegetables, root crops, pulses and oil seeds. The communities in the Zone are mainly agro-pastoralist and their livestock include cattle, goats, sheep, horses and mules [20]. The current study was conducted in Dasenech, Hammer, Benytsemay, Malle and South Ari districts (Figure 1).

STUDY DESIGN

The community based, comparative cross-sectional study design was used to determine the burden and contributing factors of household food insecurity in rural pastoralist community in South Omo Zone, SNNPR, Ethiopia. Because several studies have been conducted in central and agrarian communities, there is little evidence of studies on household food insecurity in the most remote pastoralist communities like Southern Omo.

SAMPLE SIZE DETERMINATION

The sample size was determined by single population proportion formula: with assumption of 95% confidence level, and 5% margin of error, 7% of non -response rate and 1.5 design effect, considered the previous proportion of 68.8 % [32].

$$n = \frac{(Z_{\alpha/2})^2 \times P \times (1-P)}{d^2}$$
$$= \frac{3.8416 \times 0.68 \times 0.32}{0.0025}$$
$$n = 334 \times 1.5(\text{DE}) + 7\%(\text{NR}) = \mathbf{536}$$

SAMPLING TECHNIQUE

The researchers applied a multi-stage stratified sampling method and randomly selected study respondents, using a simple random sampling method. Initially, all districts in the zone were listed and stratified into 3 ecological zones: highland, midland and lowland. For each stratum, districts were selected randomly and Kebele (smallest administrative structure in Ethiopia) was selected through simple random sampling in each district. The sample size was then allocated to the strata proportional to the population size.

SAMPLING FRAME

The sampling frame included all household in the sampled "kebele". Households are registered in the "kebele" through a community-based health information system where health extension workers

registered, so they were a resident in the community, know each village information very well. Simple random sampling was used to select households from the sample frame.

DATA COLLECTION

A structured and pretested questionnaire was used to collect data. The questionnaires were adapted from the different literature. For instance, the socio-demographic aspect of the questionnaire was adapted from demographic health and survey (DHS) [22] and the researchers also considered the work of Coates, Swindale and Bilinsky [23] to develop an instrument to measure food security, which consisted of 9 questions enquiring as to whether a specific condition associated with the experience of food insecurity had occurred in the previous four weeks.

QUALITY CONTROL

To ensure content validity, the researchers sent the instruments to four specialists in the field of nutrition, food security program managers and a statistician. The researcher revised the instrument according to the comments of the experts prior to pilot testing and actual data collection. The pilot for this study was carried out in the nearby Bakadewela district in which a population with comparable socio-demographic attributes to the study population. The data collectors and supervisors were trained over two days. The researchers and supervisors manually checked the data completeness at the end of each day.

DATA ANALYSIS

The researchers assessed the data manually for comprehensiveness and reliability. After that, the data were entered in to epi info version 7 and then exported to SPSS software version 25, then cleaned by the researchers by using frequency tables, ascending and descending order. Data were described using descriptive statistics [24] such as mean, range, and median. Moreover, bivariate and Multivariate logistic regression was applied to assess the association of independent variables such as socio-demographic and health-related variables with dependent variables of household food security [24,& 25]. In the existing investigation, the results of the logistic regression were depicted as crude odds ratio (COR), and adjusted odds ratio (AOR) with their respective confidence intervals. A *p-value* < 0.25 was used to export variables to the multivariate model. Variables with a *p-value* < 0.05 were used to determine a statistically significant association [25].

3. RESULTS AND DISCUSSION

Prevalence of household food insecurity

Based on the assessment results, the mean (\pm SD) of the food insecurity score at household level was 4.2 ± 3.1 with minimum of 0 and maximum score of 9. The prevalence of household food insecurity (access) was categorized in to four levels namely: food secure and mild, moderately and severely food insecure.

Out of the total study respondents, 12% (n=54) of the household respondents statements revealed that they had food security at household level. Furthermore, a majority, 49% (n=231) of the research respondents confirmed that they had severe food insecurity preceding the survey; followed by 17% (n=81) of the household stating that they had moderate food insecurity. The rest, 22% (n=103) of households reported that they had mild food insecurity. The overall prevalence of food insecurity was 88% [95% CI: 88.2, 91.0] (Figure 2).

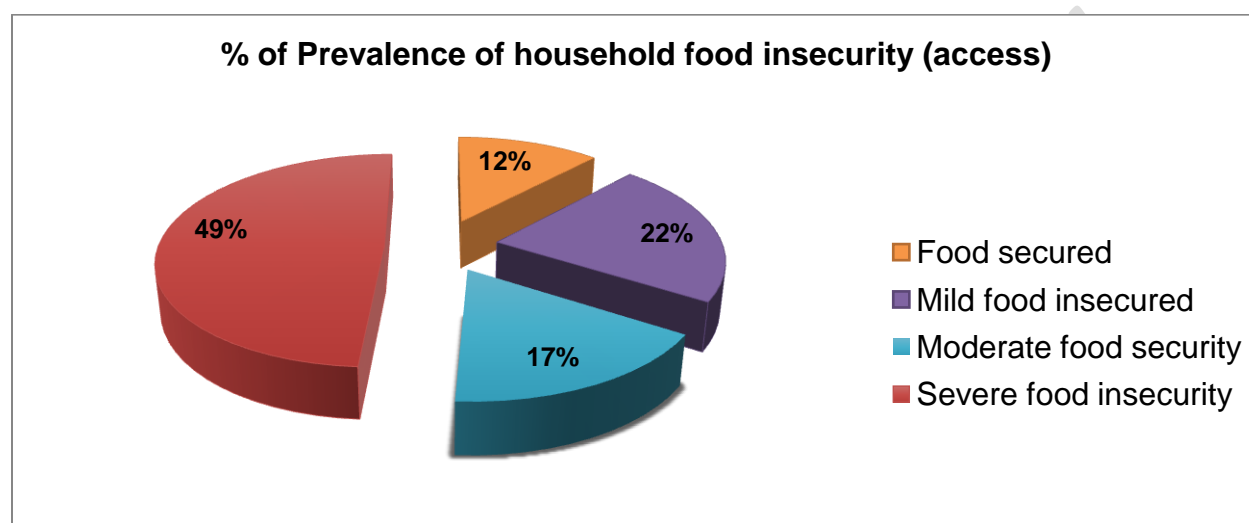


Figure 2: Prevalence of household food insecurity (access) at the community of South Omo Zone of SNNPR, Ethiopia, 2019

Out of the total study respondents, a large portion of households, 70.4% (n=330), of the research respondents stated that they were worrying about food in the 30 days preceding the survey; similarly, 69% (n=325) of the study respondents reported that they had been unable to eat their preferred diet in the 30 days preceding the survey. In addition, more than half of the households, 56.7% (n=266), indicated that they had consumed a limited range of nourishment in the 30 days before the study. About 40% (n=191) of the households (HHs) stated that they had eaten food they would prefer not to eat in the 30 days preceding the survey. 62.7% (n=294) of research respondents stated that they had eaten limited meals in the 30 days preceding the survey. Similarly, 63% (n=297) of the respondents responded that they ate fewer meals in a day, in the 30-days preceding the survey.

On the other hand, a notable number of the households i.e. 35.4% (n=166) of the respondents declared that they had no food to eat, to some extent in their house, in the 30-days preceding the survey. Out of the total study respondents, 37% (n=176) of the households stated that they often had to go to sleep at night hungry, during the thirty days leading to the survey. Similarly, nearly, one quarter, 23.5% (n=110) of the respondents indicated that they had gone an entire day and night without eating, in the thirty days preceding the survey (Table 1).

Table 1: Household food insecurity scale at South Omo Zone, SNNPR, Ethiopia, 2019

| Measurement Tool | Frequency | Percent |
|---|-----------|---------|
| Worry about food | | |
| No | 145 | 30.9 |
| Yes | 330 | 70.4 |
| Unable to eat preferred foods | | |
| No | 144 | 30.7 |
| Yes | 325 | 69.3 |
| Eat just a few kinds of foods | | |
| No | 203 | 43.0 |
| Yes | 266 | 57.0 |
| Consume diets really do not need to eat | | |
| No | 278 | 59.3 |
| Yes | 191 | 40.7 |
| Eat a smaller meal | | |
| No | 175 | 37.3 |
| Yes | 294 | 62.7 |
| Eat fewer meals in a day | | |
| No | 172 | 36.7 |
| Yes | 297 | 63.3 |
| No food of any kind in the household | | |
| No | 303 | 64.6 |
| Yes | 166 | 35.4 |
| Go to sleep hungry | | |
| No | 203 | 62.5 |
| Yes | 176 | 37.5 |
| Go a whole day and night without eating | | |
| No | 359 | 76.5 |
| Yes | 110 | 23.5 |

With respect to food security levels at each agro-ecological level, about (20.8%) of food security level was seen dominantly within highland agro-ecology zones compared with lowlands. The most elevated prevalence of (42.9%) mild food insecurity pattern among the research respondents was seen within lowland zones when compare with high land (6.1%) agro- ecological zones. Similarly, a high prevalence of (29.4%) pattern of moderate food insecurity was seen in low land agro-ecology zones when compared

with mid & high land, besides, the highest prevalence (73%) of food insecurity was seen among lowlands compared with mid and highland zones (Figure 3).

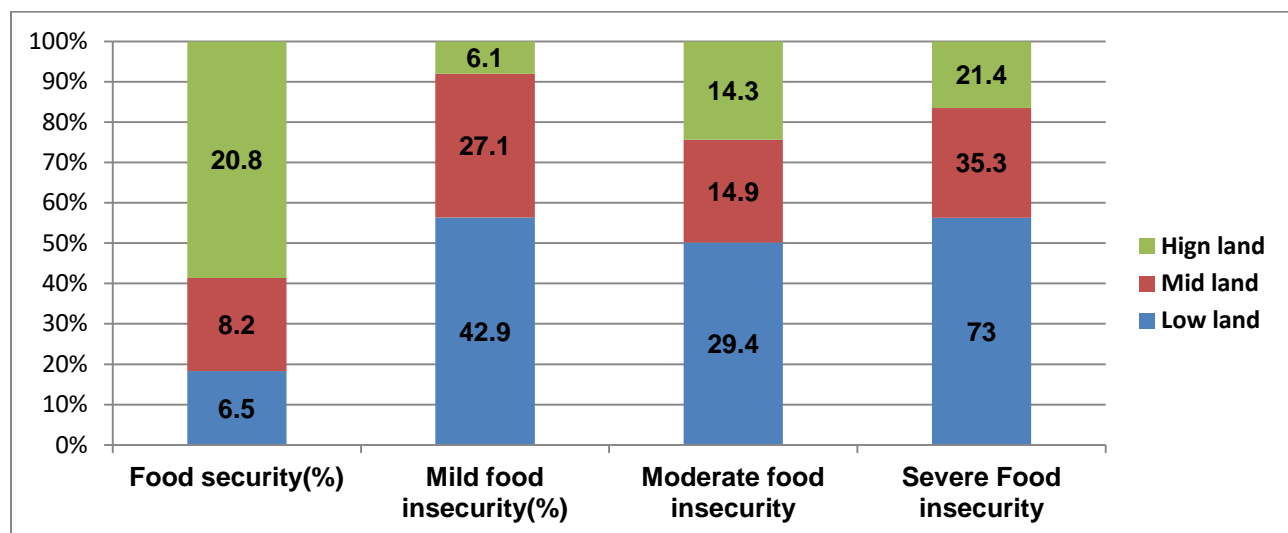


Figure 3: Household food insecurity by agro-ecological zones within the Community of South Omo Zone, SNNPR, Ethiopia, 2019.

Agricultural Land

The mean (\pm SD) value of the agricultural land was $2.17 \pm (1.5)$ with the least and greatest estimation values of 0 and 8 hectares, respectively. Out of the total study respondents, 11.1% (n=52) of research respondents revealed that, they had no agricultural land. By contrast, more than a quarter, 28% (n=133) of the households indicated that, they had one hectare of agricultural land, 26.9% (n=126), 14.3%(n=67), and 19.4%(n=91) of the households had two, three, and four or more hectares of agricultural land, respectively.

Production

Regarding food production on the land, the majority, 77% (n=362), of land was covered by maize, sorghum and/or millet. About 15.8% (n=74) of the research respondents indicated that their land was not covered by crops. Similarly, 7% (n=33) of households described that they produced other crops such as roots, tubes, fruits and vegetables. Concerning household food sources, nearly a quarter, 23.5% (n=110), of the households indicated that they purchased food. Likewise, 35% (n=165) of households indicated that their food sources were a result of their own production. A notable number, 41.4% (n=194) of respondents admitted that food sources were primarily food aid and back-up stocks, and from others (neighbors, relatives and friend support) (Figure 4).

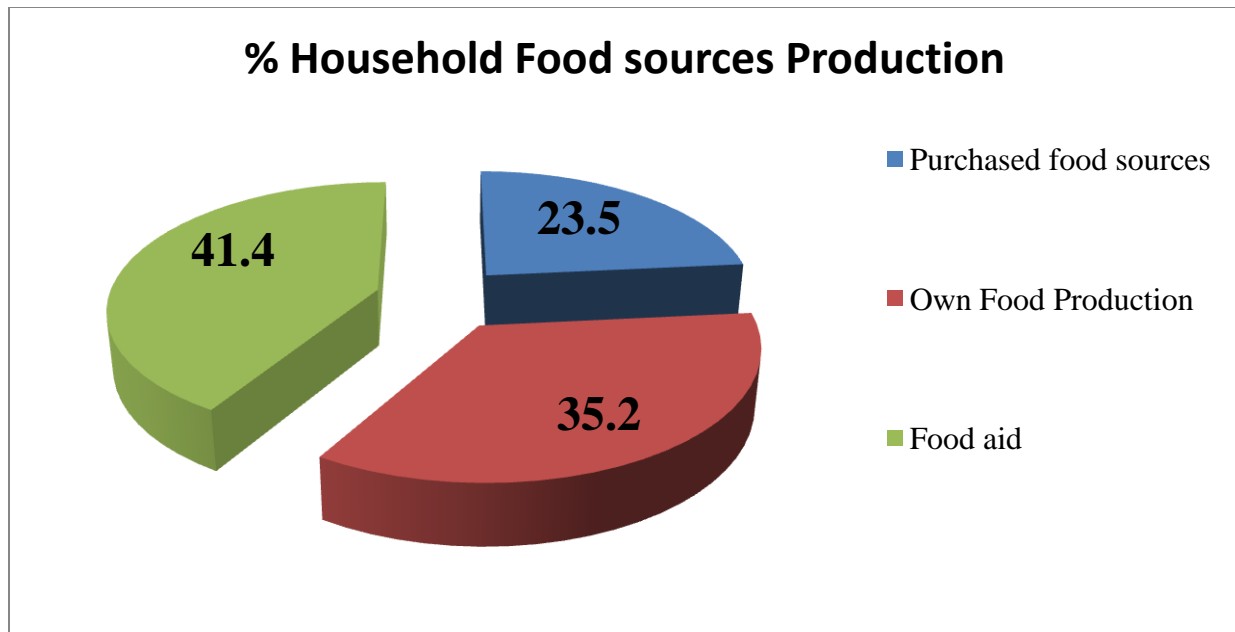


Figure 4: Household food sources within the community of South Omo Zone SNNPR, Ethiopia, 2019

Only, 24% (n= 113) of study respondents report indicated that their own food production was adequate for the whole year or to cover that period partially. In contrast, a large number, 76% (n=356), of the household report described their own production as being inadequate for the whole year, out of this,41.4% of the respondents reported their food source are food aid (Figure 4).

Causes of food insecurity

The study respondents were asked to offer the explanations for food insecurity at the household level. In response, a large number, 38% (n=182), of the households indicated that the cause of food shortage was drought. Similarly, one third, 37.1% (n=174), of the respondents showed that the cause of food insecurity was climate change. On the other hand, small proportions, 9.2% (n=43), of the study respondents reported that, the cause of food shortage at household level was absence of water/rain or irrigation for production. About, 15% (n=70) of the households responded that, the cause of food shortage was not clearly known (Figure 5).

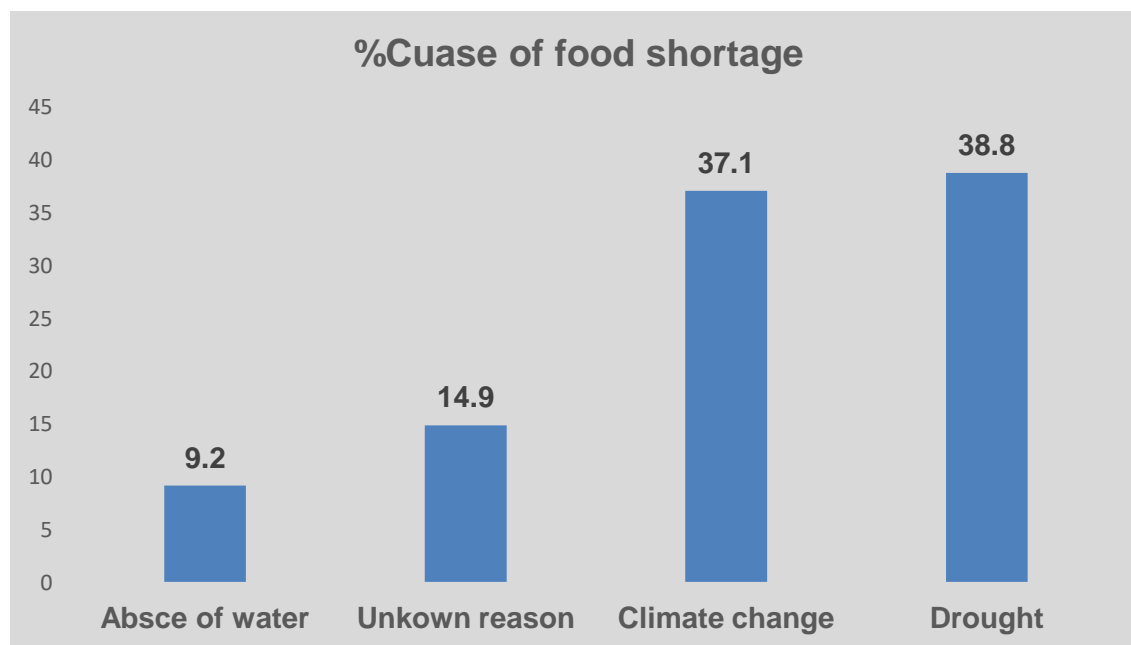


Figure 5: Causes of food scarcity in HH level within South Omo Zone, SNNPR, Ethiopia, 2019

Factors related to food insecurity

The burden of food insecurity was less likely to occur among self-production and purchased groups when compared to food aid and safety-net group ($\chi^2=7.8$, $p\text{-value}=0.007$ and $p=0.04$). The prevalence of food insecurity was 51.8% (95% CI: 47.0, 56.5) in households living within low land agro-ecology compared to highland with 29.3% (95% CI: 25.2, 33.9) ($\chi^2=19.4$, $p\text{-value}<0.0001$). Likewise, the burden of food insecurity was 77.3% (95% CI: 73.0, 81.1) higher among those who had no enough production for the years when compared to those who had enough production, 22.6% (95% CI: 18.8, 26.9) ($\chi^2=3.4$, $p\text{-value}=0.04$) (Table 2).

Table 2: Bivariate logistic regression of predictor for household food insecurity within South Omo Zone, SNNPR, Ethiopia, 2019

| Character | Food insecurity | | χ^2 | Crude OR (95%CI) | P-value |
|--|-----------------|----|----------|------------------|---------|
| | Yes | No | | | |
| Agro-ecology | | | | | |
| Low land | 215 | 15 | 19.4 | 3.7 (1.9, 7.2) | 0.000* |
| Mid land | 78 | 7 | | 2.9 (1.2, 6.9) | 0.015 |
| High land | 122 | 32 | | 1 | 1 |
| Self-production enough for the year | | | | | |
| No | 321 | 35 | 3.4 | 1.8 (1.0, 3.4) | 0.04* |
| Yes | 94 | 19 | | 1 | 1 |
| Position of economy | | | | | |

| | | | | | |
|-------------------------|-----|----|-----|-----------------|--------|
| Pastoralist | 220 | 16 | 9.5 | 2.67 (1.4, 4.9) | 0.002* |
| Agrarian | 195 | 38 | | 1 | 1 |
| HH food sources | | | | | |
| Purchased | 95 | 15 | 7.8 | 0.45 (0.2,0.9) | 0.04 |
| Self-production | 139 | 26 | | 0.4 (0.2, 0.8) | 0.007* |
| Food aid and Safety Net | 181 | 13 | | 1 | 1 |

By contrast, the reporting of food insecurity was less prevalent in the richest group 16.8% (95%CI: 13.5, 20.7) when compared with the poorest group 21.9% (95% CI: 18.2, 26.1) ($\chi^2=16.2$, $p\text{-value}=0.03$). Additionally, the proportion of food insecurity, 53.0% (95%CI:48.2, 57.7) was highest among pastoralist community members when compared with agrarian community counterparts 46.9% (95%CI: 42.2, 51.8)($\chi^2=9.5$, $p\text{-value}=0.002$).

Furthermore, ANOVA showed a mean difference among variables i.e. dietary diversity ($F=3.112$, $p=0.04$), water sources ($F=3.328$, $p=0.002$), household ($F=4.168$, $p=0.003$), agro-ecology ($F=10.10$, $p<0.0001$), household meal consumption per day ($F=13.17$, $p<0.0001$) and food sources ($F=3.94$, $p=0.020$) were all statistically related with household food insecurity.

In the multivariate analysis, possible confounders were adjusted and the characteristics that were found to be related with food insecurity during bivariate analysis were assessed via multivariate study, using the logistic regression model. The odds of food insecurity were 2.4 times (AOR=2.4, 95% CI: 1.0, 5.2) higher among households having two or fewer meals every day, than the individuals who had more than three and more meals per day. Similarly, compared to the households, which they had no need for food support, they were less likely to report food insecurity (AOR=0.2, 95% CI: 0.08, 0.4) than within the counterpart group (has shown Table 3). In the same way, respondents from low land agro-ecology (AOR=3.1, 95%CI: 1.5, 6.3) and mid land agro-ecology (AOR=2.9, 95%CI: 1.1, 7.8) had significantly higher odds to have food insecurity compared with highland agro-ecology respondents. On the other hand, the existence of food insecurity decreased when we moved up the poorest to richest wealth index. The odds for food insecurity was (AOR=2.5, 95%CI: 1.1, 3.6) 2.5 times higher odd to develop food insecurity among the poorest wealth index group when compared to the richest group. This is statistically significant association with food insecurity (has shown on Table 3).

In this study, households from pastoralist communities had 3.7 times (AOR=3.7, 95%CI: 1.6, 8.7) higher odds of food insecurity than agrarian communities (Table 3). Moreover, the odds of food insecurity were 1.8 times higher (AOR=1.8, 95%CI: 0.8, 3.7) among households which had 4-6 family members than their counterpart. This was a statistically significant relationship with food insecurity (Table 3).

Table 3: Multivariate logistic regression model of predictors for household food insecurity at south Omo Zone, SNNPR, Ethiopia, 2019

| Character | Food insecurity | | X^2 | Crude OR (95%CI) | Adjusted OR (95%CI) |
|--|-----------------|----|-------|---------------------|------------------------|
| | Yes | No | | | |
| Agro-ecology | | | | | |
| Low land | 215 | 15 | 19.4 | 3.7(1.9, 7.2) | 3.1(1.5, 6.3)*** |
| Mid land | 78 | 7 | | 2.9(1.2, 6.9) | 2.9(1.1, 7.8) |
| High land | 122 | 32 | | 1 | 1 |
| Self-production enough for the year | | | | | |
| No | 321 | 35 | 3.4 | 1.8(1.0, 3.4) | 1.5(0.7, 3.0) |
| Yes | 94 | 19 | | 1 | 1 |
| Household Wealth index | | | | | |
| poorest | 70 | 20 | 16.2 | 3.9(1.7, 9.2) | 2.5(1.1, 3.6)*** |
| poor | 82 | 14 | | 2.6(2.5, 5.5) | 1.5(1.8, 4.7) |
| Medium | 84 | 7 | | 1.2(4.5, 3.6) | 1.0(1.5, 3.0) |
| Rich | 91 | 4 | | 2.4(1.7, 8.2) | 1.9(0.5, 6.7) |
| Richest | 84 | 9 | | 1 | 1 |
| Position in community | | | | | |
| Pastoralist | 220 | 16 | 9.5 | 2.67(1.4, 4.9) | 3.7(1.6, 8.7)*** |
| Agrarian | 195 | 38 | | 1 | 1 |
| Food need during last 12 months | | | | | |
| No | 134 | 42 | 40.2 | 0.13(0.06, 0.26) | 0.2(0.08, 0.4)*** |
| Yes | 281 | 12 | | 1 | 1 |
| Family size | | | | | |
| 1-3 | 130 | 18 | 2.5 | 1.3(0.6, 2.9) | 1.5(0.6, 3.4) |
| 4-6 | 217 | 23 | | 1.8(0.8, 3.7) | 1.8(0.86, 4.0)*** |
| >6 | 68 | 13 | | 1 | 1 |

****statistically-significant

DISCUSSION

Despite current interventions, food insecurity is a global challenge in Africa and, particularly in Ethiopia. A significant body of evidence suggests that food insecurity is prevalent in agrarian communities; however, there are limited studies on food insecurity in pastoralist communities.

In the present study, 12% of households were food secure. Furthermore, the majority of the households (49%) had severe food insecurity; 17% of the households experienced moderate food insecurity, while 22% of the households had mild food insecurity. The overall prevalence of food insecurity in households was more than 85%, from mild to severe; this finding indicates a substantial burden of food insecurity in this study area.

These results correlate with evidence from a study conducted in the Kampala Slums in Uganda with a prevalence of 88.5% [26]. Another study conducted in Nairobi, Kenya showed a prevalence of 85% [27], literature from Ecuador on HFI prevalence was 81% [28], and a study conducted in Jimma, Ethiopia, indicated a prevalence of 83.5% [29]. Further, 82% of households in the Sidama districts in southern Ethiopia faced mild to severe food insecurity [30].

The current figure was higher than the previous study report from other studies in Ethiopia, including Addis Ababa 75% [31], Tigray 68.8% [32], Amhara 65.3% [33], Afar 70.4% [34], Oromia 58.5% [35], and Gojjam, Amhara 58.1% [36]. Comparatively, study reports from other countries such as South Eastern Kenya 62.7% [37] and Latin America 75% and 25%, reported moderate to severe food insecurity [38]. The possible justification for such disparity could be that data collection was conducted during the dry season (May-June) when crops were not yet viable for consumption and, due to this, food was not available and demonstrated that a change in season may affect household food security.

Research from provincial Kenya, which was carried out between the arid period and the rainy seasons showed marked contrasts between the after-effects of the two seasons. With the dry season indicating generally more elevated levels of food insecurity compared to the stormy season [39]. Seasonality is an important factor that may affect HFI as well as malnutrition [40]. This finding indicates that there was a high burden of food insecurity in the study area that requires urgent intervention to tackle the food emergency. Evidence in Norway showed that there was 93% of food insecurity among asylum seekers living in Norway and 7% of the respondents were food secure. However, the present investigation reported slightly lower than Henjum's report [41]. The reasons for such variations have been due to agro-ecological and socio-demographic characters of the study settings.

The present evidence indicated that 70.4% of the participants had a feeling of anxiety and uncertainty about food supply to the household; this evidence was similar to the previous study report from the Amhara Region, Ethiopia [33]. Similarly, 70.8% of the research respondents were worried about the accessibility of adequate food in the household in Afar, Ethiopia [42]. Food security occurs when each individual is able to access a sufficient amount of food that is affordable and nutritious [42]. However, in the present study, only 12% of households felt assured of their food security, as they experienced a diet of low-quality foods and minimal amounts of food. This finding was corroborated with study reports from the Ecuador; the finding demonstrated that women residing in homes where food was in short supply had to endure food containing less nourishment and that they experienced less varied diets [28].

As Alemu and colleagues [33] described, the elevated predominance of family food insecurity was detected in the lowlands of the Abay Valley. The present findings also showed similar results, whereby food insecurity was higher among lowland agro-ecology compared with highland agro-ecology zones. The possible reason for this could be due to lower levels of rainfall, climate change vulnerability, and low soil fertility, all of which might contribute to higher levels of food insecurity in the lowlands.

Another facet of food security that was illuminated in this study is that family size is an important factor that affects household food security. In the present investigation, the prevalence of food insecurity was higher in families of a larger number compared to households with families of a smaller number. This evidence was supported in a previous study report from the Oromia region of Ethiopia [35], as well as other evidence in Sodo [43] and Tigray, Ethiopia [32]. Another study conducted in Ethiopia confirms with the above findings [44]. The possible justification for this could be that when the family size increases, the consumption of food within that family also increases. The family may, as a result, prioritize feeding the children, resulting in the loss of access to breakfast, lunch and dinner, for a day or even many days. This can aggravate food insecurity in poorly resourced settings.

Despite global development and progress that has been made in reducing starvation in many countries, a large number of the world's population still live in poverty. Haque and colleagues assert that the very poor live crosswise over many areas and various nations. Most individuals surviving on less than \$1.25 a day live in two areas, Southern Asia and sub-Saharan Africa, representing about 80% of the very poor [45]. The current study indicated that the odds of food insecurity were 2.5 times higher among the poorest wealth index group compared with the richest wealth index group. This finding is in line with previous literature from Kenya [27], Bangladesh [45] and Beirut, Lebanon [46]. The possible explanation for this could be that poor family participants unfit to buy food from market.

A noteworthy finding in this study was that the burden of food insecurity was high in the pastoralist community as the odds of food insecurity were 3.7 times higher among the pastoralist community compared with the agrarian community. This finding was supported by a previous study by Mayanja, Akiiki, Greiner, and Morton [47]. In addition, households which reported absence of food support during the preceding 12 months were 80% more likely to face food insecurity as compared with those who had food support during the last 12 months. This evidence is supported by studies conducted earlier literature in Somali and Oromia regions, Ethiopia, revealed that harmony and danger contribute considerably to family food security [48].

The limitation of study is that data were collected in one season, so the study did not measure the effect of seasonal variation in HFI. Secondly, household food security was assessed by using the preceding 30 days as a reference. The responses, therefore, were purely based on household's memory and capacity to recall their previous diet and consumption. Finally, the cross-sectional nature of the study meant that it

did not determine effect and temporal relationship. Consequently, the researchers recommended to conducting study on similar context on large sample size and combined study design.

CONCLUSION

The study confirmed that, there was a high burden of food insecurity in the pastoralist area; low household wealth index, Lowland agro-ecology and large family size were contributing factors towards food insecurity in pastoralist communities. Therefore, local government and policy makers recommended to investing on income generating activity for pastoralist community and needs to modernize agricultural technology for small land holders to tackle food insecurity.

ETHICAL CONSIDERATION

Ethical approval was secured from the Ethics and Higher Degrees Committee of the University of South Africa (UNISA) and the UNISA Ethiopia office provided the researchers with a letter of support for the project. A permission letter was secured from the Regional Health Bureau and the South Omo Zone Health Department, respectively. The purpose and objectives of the study, the risks and benefits were explained by data collectors to the respondents. Moreover, the roles and responsibilities of the study respondents clearly described. Agreed respondent, then signed in the informed consent. The individuals who were not interested in participating were given the right to do so. Confidentiality of the data was preserved and the confidentiality of respondents were ensured, not mentioned the name of the respondents throughout the project.

REFERENCES

1. World Health Organization. Global nutrition policy review: What does it take to scale up nutrition action? Geneva, Switzerland: WHO;2013
2. FAO: See Food and Agricultural Organization of United Nation
3. Clapp, J, Moseley, WG, Burlingame, B, Termine, P. The case for a six-dimensional food security framework. *ELSEVIER Food Policy journal*. 2021: 106. <https://doi.org/10.1016/j.foodpol.2021.102164>
4. Gundersen, C and Ziliak, JP. Food Insecurity and Health Outcomes. *Food and Health journal, Health Affairs*.2015;34:11. <https://doi.org/10.1377/hlthaff.2015.0645>
5. FAO. Nutrition and Consumer Protection: Household Food Security and Community Nutrition; 2010.
6. Pereira, A.R, and Hodge A. Food insecurity: a critical public health nutrition concern. *Public Health Nutrition Journal* 2015;18(16): 2893–2894.
7. Ghattas, H. Food security and nutrition in the context of the nutrition transition. Technical Paper. Italy, Rome: FAO; 2014 (available at <http://www.fao.org/economic/ess/ess-fs/voices/en/>)
8. FAO, IFAD, UNICEF, WFP and WHO. 2018 The State of Food Security and Nutrition in the World : Building climate Resilient for Food Security and Nutrition. Italy, Rome: FAO;2018

9. FAO, IFAD, UNICEF, WFP and WHO. *The State of Food Security and Nutrition in the World 2019. Safeguarding against economic slowdowns and downturns*. Rome, FAO; 2019.
10. World Food Program (WFP). *Global Food Security Update: Tracking Food Security Trends in vulnerable countries*, Rome, Italy: WFP; 2015
11. Endale, WB, Alemu, TG, Bizuayehu S. State of Household Food insecurity in Ethiopia: Review volume. *Journal of Radix international educational and Research consortium* 2015; 4(12):1-12.
12. Abafita, J, and Kim, RK. Determinates of household food security in rural Ethiopia: An empirical analysis. *Journal of rural development* 2014; 37(2):129-157
13. Mohamed, AA. Food Security Situation in Ethiopia: A Review Study. *International Journal of Health Economics and Policy* 2017; 2(3): 86-96
14. Endalew, Muche, M, and Tadesse, S. Assessment of food security situation in Ethiopia: A Review. *Asian Journal of Agricultural Research* 2015; 9(2): 55-66
15. UNICEF. Food insecurity will be the sting in the tail of COVID-19. *The Lancet Global Health*, 2020.8.
16. Hirvonen, K, Abate GT, and De Brauw, A. Food and nutrition security in Addis Ababa, Ethiopia during COVID-19 pandemic. IFPRI Ethiopia.
17. Schanzenbach, D, Pitts, A. Estimates of Food insecurity during COVID-19 crisis: Results from the COVID impact survey. *Northwestern/Institute for Policy Research*. 2020:1-12.
18. United Nation (UN). *Transforming Our World: The 2030 Agenda for Sustainable Development*: UN; 2015
19. South Omo Zone Health Department. *Annual Health Sector Performance Report*, Jinka: South Omo Zone Health Department; 2019
20. South Omo Zone Finance and Economic development Sector. *Socio economic and geo spatial data analysis and dissemination core work process: Zonal annual statistical abstract*. Jinka: Brothers printing media; 2019.
21. South Omo Zone. *Finance-Planning document: South Omo area map*: 2019.
22. Central Statistical Agency (CSA) Ethiopia and ICF. *Ethiopia demographic and Health survey 2016*. Addis Ababa, Ethiopia, and Rockville, Maryland, USA: CSA and ICF; 2016.
23. Coates J, Swindale, A and Bilnsky, P. *Household food insecurity access scale (HFIAS) for Measurement of household food access: Indicator guide (3)*. Washington, DC: FHI360/FANTA; 2007.
24. Brink, H, Vander-Walt CV, and Resburg, G. *Fundamental of research Methodology for Health care professionals*. 4th edition. Cape Town: JUTA; 2018
25. Kothari, CR, and Garg G. *Research Methodology: Methods and Technique*. 4th edition. Delhi India: New Age International publication; 2019.

26. Nantale, G, Tumwesigye, NM, Kiwanuka, N, and Kajjura, R. Prevalence and Factors Associated with Food Insecurity among Women Aged 18-49 Years in Kampala Slums Uganda; A Mixed Methods Study. *Journal of Food Security Science and Education* 2017;5(4):120-128
27. Kimani-Murage, EM, Schofield, L, Wekesah, F, Mohamed, S, Mberu, B, Ettarh, R, Egondi, T, Kyobutungi, C, and Ezech, A. Vulnerability to Food Insecurity in Urban Slums: Experiences from Nairobi, Kenya. *Journal of Urban Health: Bulletin of the New York Academy of Medicine* 2014; 91(6): 1098–1113.
28. Weigel, MM, Armijos, RX, Racines, M, and Cevallos, W. Food Insecurity Is Associated with Undernutrition but Not Over nutrition in Ecuadorian Women from Low-Income Urban Neighbourhoods. *Hindawi Publishing Corporation Journal of Environmental and Public Health* 2016; (8149459):1-15
29. Kisi, MA, Tamiru, D, Teshome, MS, Tamiru, M and Feyissa, GT. Household food insecurity and coping strategies among pensioners in Jimma Town, South West Ethiopia. *BMC Public Health* 2018; 18(1373):1-8.
30. Regassa, N, and Stoecker, BJ. Household food insecurity and hunger among household in Sidama district, Southern Ethiopia. *Journal of Public Health Nutrition* 2011; 15(7): 1276- 1283.
31. Birhane, T, Shiferaw, S, Hagos, S and Mohindra, KS. Urban food insecurity in the context of high food prices: a community based cross sectional study in Addis Ababa, Ethiopia. *BMC Public health* 2014; (14):680
32. Asmelash M. Rural household food security status and its determinates: the case of Laelamyche woreda, central zone of Tigray, Ethiopia. *Journal of agricultural extension and rural development* 2014; 6(5):162-167.
33. Alemu, ZA, Ahmed, AA, Yalew, AW and Simanie, B. Spatial variations of household food insecurity in East Gojjam Zone, Amhara region, Ethiopia: implications for agroecosystem-based intervention. *BMC Agricultural and food security* 2017; 6(36):1-9.
34. Abdu, J, Kahssay M, and Gebremedhin M. Household food insecurity, underweight status, and associated characteristic among women of reproductive age group in Assyita district, Afar regional state, Ethiopia. *Journal of Environmental and public health hindawi* 2018;1-8.
35. Mulugeta, M, Tiruneh G and Alemu ZA. Magnitude and associated factors of household food insecurity in Fedis Woreda East Hararghe Zone, Oromia region, Ethiopia. *BMC Agriculture and Food Security* 2018; 7(3):1-8.
36. Motbainor, A, Worku A and Kumie A. Level and determinants of food insecurity in East and West Gojjam zones of Amhara Region, Ethiopia: a community based comparative cross-sectional study. *BMC Public Health* 2016; 16(1): 1-13.
37. Shinsugi, C, Matsumura, M, Karama, M, Tanaka, J, Changoma, M and Kaneko, S. Factors associated with stunting among children according to the level of food insecurity in the household:

- a cross-sectional study in a rural community of South-eastern Kenya. *BMC Public Health* 2015; 15(441):1-10.
38. Schmeer, KK, Piperata, BA, Rodríguez AH, Torres VMS, and Cárdenas FJC. Maternal resources and household food security: evidence from Nicaragua. *Public Health Nutrition* 2015; 18(16):2915–2924.
 39. M’Kaibi, FK, Steyn, NP, Ochola, S and Plessis, LD. Effects of agricultural biodiversity and seasonal rain on dietary adequacy and household food security in rural areas of Kenya. *BMC Public Health* 2015; 15(422):1-11.
 40. Ali, D, Saha, KK, Nguyen PH, Diressie, MT, Ruel, MT, Menon, P, and Rawat, R. Household Food Insecurity Is Associated with Higher Child Undernutrition in Bangladesh, Ethiopia, and Vietnam, but the Effect Is Not Mediated by Child Dietary Diversity. *The Journal of Nutrition Community and International Nutrition* 2013; 143: 2015–2021.
 41. Henjum, S, Morseth, MS, Arnold CD, Mauno, D and Terragni, L. “I worry if I will have food tomorrow”: a study on food insecurity among asylum seekers living in Norway. *BMC Public Health* 2019; 19:592.
 42. Belachew T, Lindstrom D, Gebremariam, A, Hogan D, Lachat C, Huyregts, L, and Kolsteren P. Food insecurity, food based coping strategies and suboptimal dietary practice of adolescents in Jimma zone South Ethiopia. *PLOS ONE* 2013; 8(3): e57643.
 43. Tadesse A, Demssie, T, and Kuma, B. Household Food Insecurity and Associated Factors among Households in Sodo Town. *Food Science and Quality Management* 2016; 56:10-20.
 44. Workicho, A, Belachew, T, Feyissa, GT, Wondafrash, B, Lachat, C, Verstraeten R and Kolsteren P. Household dietary diversity and Animal Source Food consumption in Ethiopia: evidence from the 2011 Welfare Monitoring Survey. *BMC Public Health* 2016; 16(1): 1-11.
 45. Haque, MA, Farzana, FD, Sultana S, Raihan MJ, Rahman, AS, Waid JL, Choudhury, N and Ahmed, T. Factors associated with child hunger among food insecure households in Bangladesh. *BMC Public Health* 2017; 17(205):1-8.
 46. Jomaa, L, Naja F, Cheaib, R and Hwalla, N. Household food insecurity is associated with a higher burden of obesity and risk of dietary inadequacies among mothers in Beirut, Lebanon. *BMC Public Health* 2017; 17 (567):1-14.
 47. Mayanja, MN, Akiiki, CR, Greiner T and Morton JF. Characterizing food insecurity in pastoral and agro-pastoral communities in Uganda using a consumption coping strategy index. *Pastoralism: Research, Policy and Practice* 2013; 5(11):1-14.
 48. Okyere, KA, Mekonnen, DA and Zerfu, E. Determinants of Food Security in Selected Agro-pastoral Communities of Somali and Oromia Regions, Ethiopia. *Journal of Food Science and Engineering* 2013; 3 : 453-471.