

Household Food Insecurity in Sub-Saharan Africa: A Systematic Review of Associated Factors and Prevalence during COVID-19 Pandemic

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ABSTRACT

Sub-Saharan Africa (SSA) carries the heaviest burden of food insecurity globally, a challenge compounded by the COVID-19 pandemic and its related restrictions. This systematic review sought to assess the prevalence and factors associated with household food insecurity in SSA during the pandemic. Searches were conducted in three bibliographic databases and two search engines on October 30, 2023, covering the period from March 2020 to October 2022. Peer-reviewed studies reporting on the prevalence and contributing factors of household food insecurity were included. The quality of the included studies was evaluated using the Strengthening the Reporting of Observational Studies in Epidemiology tool. A total of 29 publications from 12 countries were reviewed. The Food Insecurity Experience Scale (FIES) and Household Food Insecurity Access Scale (HFIAS) were the most frequently used instruments for assessing food insecurity. The prevalence of household food insecurity during the pandemic ranged from 11.2% to 98.8%, with an average rate of 53.7%. COVID-19 restrictions were linked to increased food insecurity in six studies, and pre-existing vulnerabilities, such as lower educational attainment, older household heads, and low household income, persisted. Rising food prices and a lack of alternative livelihoods further heightened household vulnerability during the pandemic. Although the review found no significant change in overall food insecurity levels compared to pre-pandemic periods, the ongoing effects of COVID-19 could worsen the situation. Immediate action, including the provision of social protection and agricultural support, is critical to preventing further deterioration in food security.

Keywords: food insecurity, hunger, households, COVID-19, and sub-Saharan Africa

1.0. INTRODUCTION

Food security is a human rights issue [1], yet 30.4% of people around the world are food insecure [2].

Food insecurity has persisted for nearly a century [3], and it is only getting worse with each passing year. The proportion of the food insecure population has

has increased by 3.8 percentage points between 2014 and 2020 [2], equivalent to 2.37 billion people in 2020. This amounted to a 320 million increase in just one year [2]. Currently, 59.6% (798.8m) and 66.2% (724.4m) of the population in Africa and Sub-Saharan Africa (SSA) are food insecure, respectively [2]. Food insecurity negatively impacted the body weight of over 11.4 million people in the SSA causing malnutrition [2].

The high cost of healthy foods has also worsened the plight of low-income earners in urban communities and increased their vulnerability to inadequate food [4]. As a result, urban dwellers in SSA have resorted to cheap and unhealthy foods leading to a sharp increase in overweight and obesity [5]. Besides the health implications, food insecurity is linked to the slow progress and development of SSA [6]. For example, food insecurity was associated with riots, violence and communal tensions in some parts of SSA [2, 7]. According to the African Centre for Strategic Studies (ACSS), almost all countries facing the heaviest burden of food insecurity in SSA are currently involved in some form of conflict [8]. Hence, addressing food insecurity could play a crucial role in consolidating the democratic achievements of SSA and enhancing its development [6]. In recent times, governments and donor agencies working across SSA have embarked on a series of interventions to improve food security [9]. These interventions include the distribution of grains and foodstuffs and improving access to farm inputs [10, 11], enhancing the capacity of smallholder farmers

[10], and buffer stock initiatives to protect farmers against production losses [12].

Despite these interventions, food insecurity is worsening in Africa [13]. No country in SSA or Africa is on track to achieving the Sustainable Development Goal 2 of ending hungry and eradicating malnutrition by 2030. The global impact of COVID-19 has threatened to deepen hunger and undermine the existing successes in achieving food security and ending hunger in SSA [14]. COVID-19 and its movement restrictions has adversely disrupted the entire agriculture value chain [4, 10] and caused job losses among low-income earners [4], which could limit physical and economic access to food.

Few reviews, however, have been conducted on household food insecurity during the COVID-19 pandemic. Earlier reviews published were either country-specific [13] or were published before COVID-19 fully impacted on SSA [15, 16]. Some of these reviews were focused on the impact of genomic research on food security [6] or COVID restrictions on planting seasons [10]. Therefore, this systematic review aims to assess the current situation of food insecurity and its associated factors among households in SSA during the pandemic. Harmonizing the findings from different studies in SSA will help assess the commitment and progress of individual nations toward the attainment of the SDG-2. Lastly, assess the relationship between women and food insecurity in the sub-region during the pandemic. Preferred Reporting Items for Systematic and Meta-Analysis was used because of

its comprehensiveness, wide use and rigour [17, 18] to conduct the study.

2.0. METHODS

2.1. Search Strategy

This systematic review was conducted using articles from Scopus, Google scholar, PubMed, and other open sources (google and yahoo search engines) on October 30, 2022. Additionally, some institutional websites such as FAO and the Africa Centre for Strategic Studies [ACCS] were also utilized in the current study.

2.2. Search Terms

This systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement of reporting [17]. Search terms were used to identify the relevant literature, and these included: “food security”, or “food insecurity”, or “hunger”, or “factors associated with food insecurity” “food insecurity among women” and “households in Sub-Saharan Africa” (Table 1). The systematic review covered studies conducted and published from the beginning of COVID-19 until October 30, 2022, and consisted of journal articles, and other published reports by established and well recognized institutions in English language.

Table 1: Search terms use for relevant articles

Subjects	Exposure	Outcomes
(Children; women; farmers; adults; students; adolescents; caregivers; households)	(“female-headed”; “male-headed”; “household-heads”; “women”; “individual”; “households”)	(“food security”; “food insecurity”; “hunger”; “predictors of food insecurity”; “determinants of food insecurity”; “determinants of hunger”)
AND		
	(“sub-Saharan Africa”; “Africa”; “West Africa”; “low-and-middle income countries”; “rural setting”; “urban centers”)	

2.3. Screening of Articles

Two reviewers conducted independent evaluation of the titles, abstracts, and then the full articles retrieved from the search using the eligibility criteria.

Discrepancies emanating from the evaluation of the two reviewers were shared with a third reviewer for a separate evaluation at each step of the process for possible inclusion or exclusion (Figure 1).

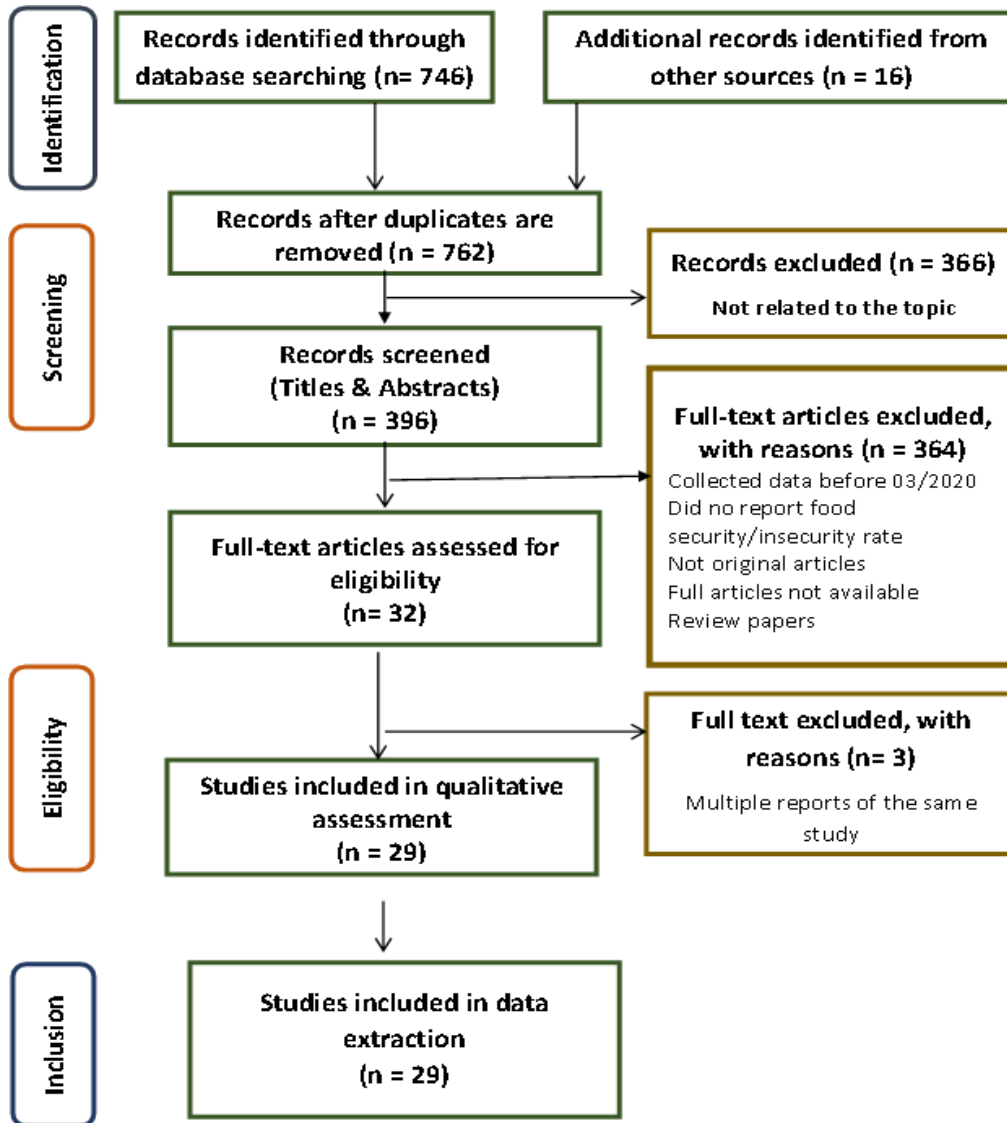


Figure 1: PRISMA flow diagram; adopted and modified from Page et al, (2021)

2.4. Selection Criteria for the Review

Only papers that met the inclusion criteria were included in the review: first, the papers measured the extent to which individuals, children, women, adults, farmers, and caregivers faced food insecurity or hunger within the context of households, secondly, and/or the papers included the factors associated with food insecurity among participants in sub-Saharan Africa, data for the papers were collected after the first quarter of 2020 when COVID-19 reached the shores of most countries in sub-Saharan Africa, and finally, the papers were published in English (Figure 1). The systematic review included both quantitative and qualitative studies

2.5. Study Quality Assessment

Inbuilt filtering features within the databases were used as the first step of reducing bias. Also, the reviewers then selected the papers that met the eligibility criteria. Strengthening the reporting of observational studies in epidemiology (STROBE) tool was used for the final selection of the papers and reports included in this systematic review [19].

2.6. Data Synthesis

The findings in the papers were graded by the study characteristics (authors, year of publications, country, study population, design used and sample size). For the main outcome variable (food insecurity), the study reported the type of assessment tools used in the study and the proportion of the sample population who were food insecure, and outlined the factors associated with food insecurity in

these studies. These were presented on tabular format to show the results of the individual studies and syntheses, together with the other details of the papers and reports (Table 1, 2, and 3).

2.0. RESULTS

2.1. Search Results

The procedure for the screening of the titles, abstracts, and the final evaluation of the full text of the papers is outlined in figure 1. The results of the 29 papers included in the study were summarized using an excel spread sheet and illustrated on the tables. Most of the papers were published in the order of 2021, 2022 and 2020.

2.2. Study design

All the papers included in the systematic review were observational studies: 94% were quantitative, 3% qualitative and 3% reports. The papers covered 1 each in Benin, Ghana, Uganda, Mali, Liberia, 2 each in Kenya, Rwanda, 5 in Ethiopia and 9 in Nigeria. Three other papers were conducted in multiple countries in SSA and 3 institutional reports 2 from the FAO and 1 from the African Centre for Strategic Studies were included in the review. The sample sizes ranged from 113 to 14,942 participants across the papers included in the study.

2.3. Prevalence of Food Insecurity

Food security continues to be a significant issue but a far fetch responsibility for the continent of Africa, especially SSA. Across the length and breadth of SSA, countries continue to battle with food shortages and inadequacies. The results in table 2 showed the findings from 29 papers from twelve different countries. The review found wider and higher rates of food insecurity in almost all published data in countries from SSA. Household food insecurity access scale (HFIAS) and food insecurity experience scale (FIES) remained the dominant scales used by the papers to measure food insecurity both at the households and individual level. These papers covered both urban and rural communities, and few others were conducted in established settings like school campuses. Specifically on the assessment tools, 57.7% (15) of the papers used HFIAS to measure food insecurity, and 15.4% (4) also used FIES.

The data demonstrated households' food insecurity ranged from 11.2% to 92.7% across SSA. Except for FAO *et al.* [2], FAO *et al.*, [20] and Sanga *et al.*, [21], 13,998 (35.3%) out of 39,700 participants in all the

papers experienced food insecurity during the period of the pandemic. However, the average percentage food insecurity across all the papers included was 53.7% (table 3). In the two FAO reports available, the rates of food insecurity for 2020 and 2021 were 56.8% and 66.2%, respectively [2, 20]. On average, 46.6% of rural dwellers experienced food insecurity from the period of 2020 to 2022, as compared with 63.9% in urban dwellers. Similarly, 62.9% of participants in papers done in both rural and urban settings reported food insecurity. School-based studies showed that 80.4% of the students experienced food insecurity. The household hunger score reported rates of food insecurity ranging from 15.6% to 61.1% as compared with 68.1% with the use of food consumption score. The use of HFIAS and FIES observed prevalence range of 11.2% to 98.8% and 31% to 92.7% rates of food insecurity. Average percentages of food insecurity per assessment tools are presented in table 5; HFIAS (64%), FIES (46.4%), hunger score (38.4%), RFSA (43.7%), FGT (23.2%) and consumption score (68.1%) (Table 3).

Table 2: Prevalence of food insecurity in sub-Saharan Africa during COVID-19.

No.	Authors	Year	Design	Target group	Study location	Sampling protocol	Instrument	Sample Size	Prevalence
1	ACSS,	2021	-	Population	Urban	-	-	-	-
2	Adusei,	2021	Cross-sectional study	Household farmers	Urban	Purposive sampling	FIES	50	16 (31%)
3	Arinaitwe <i>et al.</i> ,	2021	Cross-sectional	HIV men	Rural	Systematic sampling	HFIAS	252	189 (75%)
4	Charles Shapu <i>et al.</i> ,	2020	Cross-sectional	Adolescents' girls	School setting (urban)	Simple random	HFIAS	612	567 (92.7%)
5	Danso-Abbeam <i>et al.</i> ,	2021	Cross-sectional	Farmers	Rural	Multi-stage	FIES	534	195 (36.5%)
6	Dasgupta <i>et al.</i> ,	2021	Cross-sectional	Households	Rural & Urban	Simple random	Hunger score	14,942	2,337 (15.6%)
7	Davis <i>et al.</i> ,	2021	Cross-sectional	Students	School setting (urban)	Purposive sampling	Food consumption	113	77 (68.1%)
8	FAO <i>et al.</i> ,	2021	Survey	Households	Rural & urban	-	FIES	-	(66.2%)*
9	FAO <i>et al.</i> ,	2020	Survey	Households	Rural & urban	-	FIES	-	(56.8%)*
10	Gwada <i>et al.</i> ,	2020	Cross-sectional	Households	Rural	Multi-stage sampling	HFIAS	201	145 (72%)

	Houessou <i>et al.</i> ,	2021	Empirical studies	Gardeners / Farmers	Rural Urban	& Multi-stage cluster	RFSA	240	211 (88%)
12	Ibukun & Adebeyo,	2021	Survey	Households	Rural Urban	& Simple random	FIES	1950	1716 (88%)
13	Kara & Kithu,	2020	Cross-sectional	Households	Rural	Simple random	HFIAS	2259	253 (11.2%)
14	Kassy <i>et al.</i> ,	2021	Cross-sectional	Households	Rural	Multi-stage sampling	Hunger scale	800	489 (61.1%)
15	Neme <i>et al.</i> ,	2021	Cross-sectional	HIV adults	Rural	Systematic sampling	HFIAS	305	166 (54.3%)
16	Ogunniyi <i>et al.</i> ,	2021	Cross-sectional	Farmers	Rural	Multi-stage	FGT	250	58 (23.2%)
17	Sanga <i>et al.</i> ,	2021	Cross-sectional	Farmers	Rural	Snow balling	-	16*	-
18	Tirfessa <i>et al.</i> ,	2020	Cross-sectional	Households	Rural	Purposive sampling	HFIAS	273	108 (39.7%)
19.	Salau <i>et al.</i> ,	2022	Cross-sectional	Women (Gari processors)	Rural	Multi-stage sampling	USDA module	120	73 (60.8%)
20.	Tafese <i>et al.</i> ,	2022	Cross-sectional	Mothers	Rural	Simple random	HFIAS	371	249 (67%)
21.	Tabe-Ojong <i>et al.</i> ,	2022	Cross-sectional	Households	Rural	Stratified sampling	HFIAS	1762	728 (41.3%) ^a
22.	Maredia <i>et al.</i> ,	2022	Cross-sectional	Households	Rural Urban	& Simple random	RFSA	4000	1560 (39%) ^b

23.	Folayan <i>et al.</i> ,	2022	Cross-sectional	Adults	Urban	Convenience sampling	RFSA	4471	1288 (28.8%)
24.	Umutoniwase <i>et al.</i> ,	2022	Cross-sectional	HIV patients	Urban	Stratified sampling	RFSA	220	42 (19.1%)
25.	Adeomi <i>et al.</i> ,	2022	Cross-sectional	Adolescents & Preschoolers	-	Multi-stage sampling	HFIAS	1200	568 (47.3%)
26.	Debele <i>et al.</i> ,	2022	Cross-sectional	Pregnant women	Urban	Systematic random sampling	HFIAS	441	78 (17.7%)
27.	Otekunrin,	2022	Cross-sectional	Farming Households	Rural	Multi-stage sampling	HFIAS	352	320 (90.9%)
28.	Negese <i>et al.</i> ,	2022	Cross-sectional	Households	-	Multi-stage sampling	HFIAS	3532	2120 (60%)
29.	Omachi <i>et al.</i> ,	2022	Cross-sectional	Preschoolers	Rural	Multi-stage sampling	HFIAS	450	445 (98.8%)

^a and ^b represent average percentage from three and five different countries in their respective studies, - and * mean that the sections were excluded from the analysis due to data challenges.

Table 3: Summary of percentage averages by assessment tool and year of publication

Assessment Tool	Average Percentage
Food insecurity experience scale	55.5%
Household food insecurity access scale	59.5%
Hunger Score	38.4%
Food Consumption Score	68.1%
Rapid food security access scale	43.7%
Foster–Greer–Thorbecke (FGT)	23.2%
USDA model	60.8%
Year of Publication	Average Percentage
2020	54.5%
2021	55.2%
2022	51.9%
Study Setting	Average Percentage
Rural	46.6%
Urban	63.9%
Both rural and urban	62.9%
Average for all studies	53.71%

2.4. Factors Associated with Food Insecurity

Factors that were associated with food insecurity included COVID-19 restrictions and household characteristics. In total 22 factors were found to have limited the ability of households to access adequate food during the pandemic. These factors were grouped into six broad categories: socioeconomic or sociodemographic, production challenges and agriculture support services, climate change, covid-

19 closures and restrictions, and conflicts and political crisis (Table 4).

2.5. Socioeconomic factors

Education was reported in six out of twenty-nine papers to be associated with food insecurity (Table 4). Household heads with lower status of education to had limited access to food for their members. [22-27].

Lower household income was also identified as a significant factor for household food insecurity [23, 24, 28].

Again, households with little income including remittances or alternatively lacked livestock to trade had limited access food during the pandemic [28]. Households with off-farm income had better savings to avert food shortages at homes during the period. The third most important sociodemographic factor for food insecurity in the papers was the age of the household heads. Five out of twenty-nine papers reported older ages (above 50 years) of the household heads, two reported dependency ratio and one reported marital status, associated with food insecurity in the study [22, 24, 28, 29].

2.6. Agricultural and its related factors

Household heads who were involved in farmer-based groups or cooperation activities [27, 30], and had access to farm extension visits [24, 28], and who adopted crop and livestock diversification [28, 31] had better chances of being food secure compared to households without the above-mentioned factors. Some households were challenged by the non-availability or high cost of farm inputs [21], and the lack of access to credit facilities [21, 27] to increase production, while others were limited by the size of the farm land available to them for food production [21, 28].

2.7. Climate change factors

The effects of climate change on food production at the household level persisted during the pandemic; Drought, shorter rainfall and climate variability including higher temperatures were identified to be associated with food insecurity in three out of twenty-nine papers [2, 4, 8].

2.8. Direct Covid-19 Closures and Restrictions

In table 4 six out of twenty-nine papers found movements and boarder restrictions, disruption in food supply chain and planting seasons, and COVID-19-related issues to be associated with food insecurity [2, 4, 8, 32-34]

2.9. Conflicts

The last category of food insecurity related factors was the influence of ethnic conflicts and political crisis (Table 4). Both the Africa Centre for Strategic Studies and the FAO found that countries with protracted ethnic and political conflicts were the hardest hit in terms of food insecurity[2, 8]. Countries such as Sudan, Mali, D.R. Congo and Burkina Faso which experienced the heaviest burden of food insecurity were actively involved in some forms of conflicts [8].

Table 4: Factors Associated households' food insecurity in SSA during COVID-19

Factors	Authors	Frequency
Socioeconomic/demographic Factors		
High household dependency ratio	[29, 35]	2
Marital status	[29]	1
Older household heads (Age)	[22, 24, 28, 29, 35]	5
Inadequate / lack of remittances	[24]	1
Wealth status	[30]	1
Increased food price	[4, 8]	2
Low household income (Livestock)	[23, 24, 28, 34, 36]	5
Lower educational status of household head	[23-28]	6
Climate Changes Related Factors		
Drought/short rainy season/ climate variability; temperature.	[2, 8, 21]	3
Production Challenges and Agriculture Support Services		
Farming groups / cooperatives	[27, 30]	2
Extension visits	[24, 28]	2
Lack or high farm inputs prices	[21]	1
Smaller land size	[21, 28]	2
lack of access to credit	[21, 27]	2
Lack of alternatives livelihood activities (Savings, off-farm income etc.)	[28]	1
Covid-19 Closures and Restrictions		
COVID-related restrictions	[2, 4, 8, 32-34]	6
Conflict / political crisis		
Ethnic conflicts and political crisis	[2, 8]	2

3.0. DISCUSSION

3.1. Prevalence of Food Insecurity

Even though food security is deemed a fundamental human right [1], a substantial portion of the global population remains food insecure and malnourished [37]. In Sub-Saharan Africa (SSA), this issue persists at critical levels. To improve the accuracy of measuring food insecurity, the FAO introduced the

Food Insecurity Experience Scale (FIES) to replace older metrics like the hunger score [37]. This tool aims to capture a more precise picture of food experiences at the household level [38, 39]. However, the review highlights that despite the measurement improvements, over half (53.7%) of the population in SSA remains food insecure, across diverse demographic groups.

Interestingly, the prevalence of food insecurity during the pandemic was not drastically different from pre-pandemic levels [20, 37, 40]. While COVID-19 threatened to affect every sector of the economy, including agriculture, the direct impact on food insecurity in SSA appears to have been somewhat muted. This might be due to the fact that the pandemic disproportionately impacted urban areas where formal employment is more common, whereas much of SSA's rural workforce, which is heavily involved in food production, was less affected by strict lockdown measures [40, 41]. The relatively stable rates of food insecurity in rural settings may reflect the resilience of rural households in SSA, which largely rely on subsistence farming. Many rural households were likely able to continue meeting their routine food needs despite the pandemic's disruptions. Moreover, it is plausible that many of these households had savings or food reserves, which cushioned the initial economic shocks of the pandemic [42, 43].

In a similar systematic review, Gebremichael, Beletew [44] found comparable rates of food insecurity in East Africa during the pandemic, reporting a prevalence of 60.9%. This suggests that there is no immediate need to revise or establish new global food security objectives specifically in response to the pandemic [45]. Instead, the focus should be on strengthening existing strategies and accelerating efforts toward achieving already established goals, as the pandemic has not significantly altered the overall trajectory of global food insecurity. Country-specific pre-pandemic

studies in SSA, such as in Kenya (61%) and Ethiopia (60.5%), reveal consistent food insecurity levels [46, 47]. However, some countries like Nigeria, Benin, and Kenya reported much higher rates (88-92%) even before the pandemic, illustrating the deep-rooted nature of the food insecurity crisis in these regions [24, 48]. The findings from this review align with a global study, where a 60% prevalence of food insecurity was observed across 147 countries [49]. Although SSA's rates are relatively stable compared to the pre-pandemic era, they remain significantly higher than those in other regions, such as the Middle East and North Africa (31.05%) [49], and slightly lower than those in West and Central Africa (80.81%) and East and Southern Africa (92.18%) [49].

While the overall prevalence of food insecurity may not have drastically worsened during the pandemic, subgroups like women experienced higher levels of insecurity. For instance, food insecurity rates among women in SSA ranged from 60-67%, which represents a 13% increase compared to the overall population average in this review [35, 50]. This disparity aligns with findings from the FAO, which reported that women faced a 10% higher prevalence of food insecurity compared to men, due in part to the compounded effects of COVID-19 [2]. This suggests that while the general picture of food insecurity in SSA has remained stable, the pandemic has intensified vulnerabilities among specific demographic groups, necessitating targeted interventions. In summary, the review reveals that while COVID-19 pandemic exacerbated existing

challenges such as job losses, supply chain disruptions, and rising food prices, the overall prevalence of food insecurity in SSA remains largely consistent with pre-pandemic levels. However, the pandemic's longer-term effects, particularly on vulnerable groups like women, could pose significant risks if adequate social protection measures are not put in place.

3.2. Factors Associated with Food Insecurity

COVID-19 Closures and Movement Restrictions

The full impact of the COVID-19 pandemic on household livelihoods remains difficult to fully assess at this stage, as its effects continue to unfold and may persist for several more years [2]. Nevertheless, available data indicate that COVID-19 has already had a significant negative impact on the food supply chain, contributing to a potential worsening of malnutrition worldwide [2, 4]. In Sub-Saharan Africa (SSA), where food systems are already fragile and many countries are highly dependent on food imports, public health measures such as border closures and movement restrictions further disrupted the food supply chain [10, 51]. These restrictions, implemented to curb the spread of the virus, unintentionally exacerbated food shortages in the region. Markets were closed or restructured, limiting access to food and causing unexpected price spikes for staple goods [4]. Job losses within the informal and private sectors further reduced household incomes, compounding the challenges

many families faced in securing adequate food supplies [10]. The combination of higher food prices and reduced income heightened household food insecurity, particularly for vulnerable groups [4]. In some cases, the pandemic restrictions disrupted crucial agricultural activities, particularly in urban areas where strict safety protocols were enforced. Farmers in these areas experienced delays in planting seasons and reduced access to agricultural inputs, further straining food production [10]. These disruptions not only affected food availability but also contributed to long-term concerns about food security, as weakened supply chains and interrupted agricultural cycles pose ongoing risks to household food access. Thus, while the full scope of COVID-19's impact on food security is yet to be fully realized, the immediate effects have already revealed vulnerabilities within SSA's food systems.

Socioeconomic factors

The older age of household heads on the physical availability of adequate food is one of the important variables documented across numerous research [22, 29]. This supports the finding that in SSA, older heads of households are more vulnerable to food insecurity [46, 52-55]. For food production, household farmers relied significantly on manual labour [10]. As a result, as the heads of households got older, they were less physically capable of providing manual labour to generate enough food from the farms. This is due to the fact that aging is linked to a loss muscular mass and strength [56]. Drammeh et al. (2019) and other studies also support this finding that elderly household heads were less

physically capable of engaging in off-farm activities to supplement their income and meet the demands of their family members, thereby exposing them to food insecurity [28, 54].

Lower educational status of household heads was widely reported to be a significant barrier for food security. This is consistent with the 2020 comprehensive food security and vulnerability analysis report [57]. This is probably because education increases receptivity and utilization of modernized farming system, including the adoption of technological inputs, fertilizer application and crop-income diversification to secure households' physical access to food[54, 58]. Uneducated household heads were probably less likely to get appropriate resources in terms of access to loans or inputs from farm dealers to increase food production, or they may have retired from formal employment and are facing a reduction in income.

The availability of household assets such as livestock provided adequate buffer against food insecurity [24, 28]. In the event of crop failures, household resorted to their livestock for alternative income to purchase food. Additionally, households obtained partly their household food sources directly from the animal produce such as milk and meat to sustain its members. Some households also obtained manure from their livestock which was used to fertilize their farm lands for improved crop yield against food insecurity [59].

The lack of alternative livelihood activities significantly impacted on food security at the household level. Income from household savings and

off-farm jobs enabled households to acquire additional food, cultivate larger farmlands, and diversified and intensified their farming activities to increase food production. This finding is consistent with another study conducted in SSA before the pandemic which reported that households with off-farm income were more likely to be food secure particularly in poorer regions and female-headed households[60]. This is probably because, women are more likely to spend their extra income on basic needs such as food for the family than men[61, 62]. This also meant that households with lower income status were unable to acquire the needed food or make the needed investment in their farms. The situation was further compounded by reduced remittances from friends and other family members, higher dependency ratio and increased food prices [4, 8, 46, 58, 63].

Lastly, marital status provided protection against food insecurity for some households [29]. This is because both spouses helped each other contribute to the food needs for their households [58, 64]. Additionally, husbands offer a form of social protection for women to access land for farming purposes which could have been a protective factor against food insecurity. The evidence suggests that women on their own, have poorer access and control of resources including land [23]. In many instances however, women directly contributed more to household food security than men, due to the peculiar role they play along the food chain [65, 66]. The situation was, however, different with the absence or death of the husbands. This is largely so because

other existing socioeconomic factors such as income and education vary by gender, which ultimately impact on their physical access to food [67]. This was evident in the recent FAO report indicating women face 10% higher prevalence of food insecurity than men due to the current impact of COVID-19 [2].

Agricultural and its related factors

Food production in Africa continue to linger for quite a long time now[39]. Subsistence farming is the main means of households' food production for the larger population of SSA [41]. So, one of the major ways households' farmers got support for farming is through forming cooperation or farmers-based organizations. These cooperation significantly protected households against food insecurity [24, 28]. Households in farming cooperation attracted new technologies, information and skills from government and other agencies which insulated them from the impact of food shortages [68, 69]. These farmers easily adapted to climate variabilities by switching to improved and new crops-livestock diversification and also were able to access farm inputs like seeds, fertilizers, plough servicing than their other counterparts [69]. They equally attracted extension visits to help them navigate through the challenges for improve food productions [24, 55, 70]. The size of households' farmland influenced the amount of food available for their members [71-73]. Larger farmlands enabled households to grow a wider variety of crops against the impact of bad weather. They also generated extra income from leasing parts of the lands to other users [46]. Smaller

farmland limited not only the types of crops households could grow on the field but also, determine the farm yield for household consumption [54, 68]. The activities of local lending agencies compounded the situation of food insecurity [21, 27]. In some instances, these agencies offer loans at exorbitant interest rates as high as 75%. Meaning that the limited foods produced had to be sold to repay the loans, while others lost their farm lands to the lenders, leaving them in persistent food shortages [54].

Climate change factors

Households' food security was significantly affected by climate change variables. Among the many reasons, adequate mechanisms and capacity of household are lacking to enable them to cope with the multiple impact of the climate change [39, 74]. Almost all the households in Sub Saharan Africa depend mainly on rainfall for food production [74] and the slightest variation in weather pattern significantly affect planting season leading to low yield . In some instances, extreme rainfall results in high volumes of water, destroying farm lands and crops [8, 21]. Rain-fed agriculture is proven however, to be unsustainable to meeting the food needs of the increasing population of SSA [75, 76]. Evidently only 5% of farm lands are irrigated [75]. Households with access to climate variability information and irrigation facility were proven to cope better and had improved physical access to food during the pandemic [53, 69].

Conflicts

During COVID SSA witnessed several conflicts and in some instances, human lives were destroyed including crops, livestock, and homes [39, 77]. This resulted in emergency food insecurity situations in some parts of SSA like Sudan, Zimbabwe, DRC and Mali [8, 39]. Ethnic conflicts and political crisis also limited the ability of state institutions and other agencies to provide the needed support to produce or increase food production in the affected countries [8]. The relationship between conflict and food insecurity is well documented [8, 39].

4.0. CONCLUSION

Food insecurity remains a persistent and critical challenge in Sub-Saharan Africa (SSA), with the COVID-19 pandemic exacerbating existing vulnerabilities. This review highlights that, while no drastic changes in the overall prevalence of food insecurity were observed during the pandemic, the disruption of food supply chains, agricultural cycles, and widespread job losses have compounded the challenges already faced by households in the region. Pre-existing factors such as low household income, lower educational attainment, and the older age of household heads have persisted as key contributors to food insecurity during the pandemic, alongside new pressures such as rising food prices and limited livelihood alternatives. Although the immediate impact of COVID-19 on food insecurity may not seem markedly different from pre-pandemic levels, the long-term effects could significantly worsen the

situation if proactive steps are not taken. The pandemic has exposed weaknesses in food systems and underscored the need for targeted interventions. Therefore, it is imperative that governments and stakeholders prioritise the implementation of robust social protection programmes and strengthen agricultural support services. These measures will be crucial in ensuring household resilience and preventing further deterioration in food security across SSA, particularly as the effects of the pandemic continue to unfold. Urgent action is needed to safeguard the region's progress toward achieving Sustainable Development Goal 2 and to mitigate the potential long-term impacts of the pandemic on food security.

Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Author Contributions

Conceptualization, F.Z.T. and A.N.O.; methodology, F.Z.T. and A.N.O.; software, F.Z.T.; validation, A.N.O.; formal analysis, F.Z.T.; investigation, F.Z.T.; resources, F.Z.T. and A.N.O.; data curation, F.Z.T. and A.N.O.; writing—original draft preparation, F.Z.T. and A.N.O.; writing—review and editing, A.N.O.; visualization, F.Z.T.; supervision, A.N.O. All authors have read and agreed to the published version of the manuscript.

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