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# Coping Strategies for Household Food Insecurity, and Perceived Health in an Urban Community in Southern Mozambique: A Qualitative Study

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**Abstract:** In low- and middle-income countries, food insecurity (FI) is a living reality for many households, particularly among the most vulnerable groups. The burden of household FI in Mozambique and how FI and coping strategies relate to perceived health are unknown. This study investigated the lived experiences and coping strategies of food-insecure households, along with their perceived health. Altogether, 16 in-depth interviews were performed, audio-recorded, and transcribed verbatim. A qualitative content analysis was carried out and five themes emerged: lived experiences of FI, coping strategies used in situations of FI, food choices, climate change and food security, and FI and perceived health. A wide range of lived experiences and coping strategies were reported, including cooking whatever is available, skipping meals, receiving money or food from friends and relatives, eating unsafe and low-quality foods, taking on additional work, cooking least-preferred foods, and having a monotonous and less-nutritious diet. Furthermore, the participants reported emotional distress, anxiety and depression, substance use, and other negative health outcomes. Some had diagnoses of hypertension, diabetes or HIV/AIDS. The findings suggest the need for employment creation and women's empowerment, as well as the implementation of appropriate policies and programmes to alleviate household FI.

**Keywords:** food insecurity; coping strategies; perceived health; in-depth interviews; Mozambique

## 1. Introduction

Household food insecurity (FI) is a living reality for the vast majority of people in low- and middle-income countries (LMICs) [1]. Food insecurity entails lack of nutritionally adequate and safe food, and also a limited ability to acquire food in socially acceptable ways [2]. The term “socially acceptable ways” describes practices that are considered “dignified and in keeping with social norms” [3].

According to a report by the Food and Agriculture Organization of the United Nations [1] (p. 8), “while the global prevalence of moderate or severe FI has been slowly on the rise since 2014, the estimated increase in 2020 was equal to that of the previous

five years combined” because of the COVID-19 pandemic. The report adds that close to 12% of the global population were severely food-insecure in 2020, which is an increase of 148 million people compared with 2019. In addition, the gender gap has grown larger, with the prevalence of FI being 10% higher among women than among men in 2020, compared with 6% in 2019 [1]. Unlike high-income countries, sub-Saharan Africa (SSA) has been facing serious challenges in feeding its population because of climate change and rapid population growth [4,5]. Furthermore, the COVID-19 pandemic has worsened the scenario of FI and poverty worldwide [6].

Household resilience to FI has traditionally been characterized by a host of behavioural responses translated into coping strategies, which may reflect the vulnerability of households, depending on socioeconomic and cultural factors [7–9]. In addition, research evidence indicates that the more food-insecure households are, the more they are likely to engage in risky behaviours and coping strategies (e.g., having multiple sexual partners, engaging in commercial sex, consuming unsafe food) that could be detrimental to their health [10–12]. Furthermore, FI and health-compromising strategies can exacerbate existing diseases, and can contribute to increased healthcare utilization and, hence, increased health care costs [13].

To reiterate, FI—especially severe FI—is associated with the consumption of low-quality food [14,15] and unsafe food [12,16], and also with sexual risk behaviours and substance use [11]. By contrast, food security entails healthy nutrition and food safety [17]. The first of these, healthy nutrition, concerns the nutritional quality of diets, and addresses issues related to malnutrition in all its forms, including associated non-communicable diseases [17]. The second, food safety, relates to keeping food free from contamination and preventing food-borne diseases (FBDs), and is related to food handling during its production, storage, preparation, processing and transportation [18]. Food safety is a serious issue in LMICs [19], including Mozambique [20–22], especially because of FBDs and food-borne pathogens [23,24]. Likewise, food-borne outbreaks are of great concern across the world [25], and *Campylobacter* spp. and *Salmonella* spp. are among the most important food-borne pathogens in the European Union [26,27], though this trend may vary between regions and countries [28,29].

Like other African countries, Mozambique is a low-income, food-deficit country with high inequality, and is prone to natural disasters, with regular droughts and floods occurring almost annually in major river basins [30–32]. The majority of reports in Mozambique have focused on households affected by natural calamities and food price shocks [31,32] but not on the general population or different societal groups (i.e., with different employment status, income, education, etc). Moreover, the specific contexts that compel households to apply food-related and/or financial coping strategies are not well defined. However, the understanding of coping strategies at the household level becomes critical in formulating and implementing appropriate policies and health programmes designed to alleviate FI. This paper sought to investigate the lived experiences of and coping strategies used by households in situations of FI in southern Mozambique. In addition, the paper sought to understand the perceived causes of FI and how participants relate FI to their health.

## 2. Materials and Methods

### 2.1. Study Setting and Participants

This is an exploratory study that was conducted in Maputo, southern Mozambique. Maputo is the capital city of Mozambique, and is divided into seven municipal districts, including KaNyaka Island and Katembe across the bay. The other five are divided into neighbourhoods or *bairros*. Maputo’s urban landscape is usually divided into three areas. The first is the wealthiest area of the city, the KaMpfumu district. The second consists of the poorer residential suburbs, and covers Nihamankulu and KaMaxakeni (or KaMaxaquene). The third is the peri-urban districts of KaMavota and KaMubukwana [33]. Maputo continues to represent the largest urban agglomeration in Mozambique, although Matola is growing rapidly and becoming a dormitory city for the new urban poor [34].

In Maputo, in particular, and in the Greater Maputo as a whole, there is a high level of underemployment, with most people being engaged in subsistence agriculture and informal work [34]. According to the 2017 census, Maputo has a total population of about 1,080,277 inhabitants (52% female and 48% male), and has 235,750 households [35]. The southern region of Mozambique, where Maputo is located, is prone to regular droughts, and floods occur almost annually in major river basins and poorly drained urban settlements [30]. In Maputo, about 71% of the households are food-insecure [36], compared to 67% in Matola [37].

Against this background, the present study was conducted; the study participants were selected using purposive sampling based on pre-selected criteria which were relevant to the study's aim [38,39]. The eligibility criteria for the study were being the head of a food-insecure household, being aged 18–60 years, and residing in a suburb or peri-urban district of Maputo. Food-secure households and food-insecure households whose heads either did not match the age criteria, did not agree to participate, or decided to drop out were excluded. In collaboration with the municipality, eligible households were approached and informed about the objectives and voluntary nature of the study. They were invited to participate, and had up to 5 days to respond to the invitation letter.

Based on data saturation criteria [40], 16 in-depth interviews were carried out using a semi-structured interview guide [38]. A semi-structured interview guide ensures that all of the key elements are captured while still allowing flexibility to explore other issues and perspectives of interest that may arise during the conversation [41]. On the other hand, owing to the sensitivity of the phenomenon under study, face-to-face individual interviews (rather than telephone interviews) seemed to be the most appropriate method, as they provide the most direct approach to gathering detailed and rich data [41]. A total of eleven women (23–46 years) and five men (30–52 years) participated in the study. The sociodemographic characteristics of the study participants are presented in Table 1.

**Table 1.** Sociodemographic characteristics of the study participants.

KERRYPNX	N = 16
Sex	
Male	5
Female	11
Age, years	
≤29	3
30–39	7
≥40	6
Education	
Secondary school (grade 8–10)	8
High school (grade 11–12)	4
University	4
Current profession	
Self-employed	9
Government official	4
Private sector	3

## 2.2. Data Collection and Procedure

Face-to-face interviews were performed at each participant's home over 2 months (August and September 2021) by the first author, E.M., accompanied by an external collaborator who received specific training for this purpose. The interview guide was piloted by authors E.M. and E.S. in order to ensure that it was accurate and effective, and that the interviews were conducted in accordance with appropriate interview procedures (including building rapport and trust with participants). The original interview guide was written in English (see Table 2), translated into Portuguese, and back-translated into English for accuracy. The questions included, besides socioeconomic and demographic ones, several domains regarding the participants' experiences and perceptions of FI, coping strategies, frequently

consumed foods, climate change, and health. Each interview lasted about 40–65 min, with an average of 50 min. All of the interviews were performed in Portuguese. The interviews were audio-recorded, transcribed verbatim, and checked for accuracy.

**Table 2.** Interview guide.

Topic of Discussion for the Interview
1. Could you please tell us what food security means to you and your family?
2. How would you describe the current state of your family's food security?
3. What are the key factors that contribute most to food insecurity in your family?
4. When do you usually run out of food and money to buy food? What do you usually do? Which coping strategies do you usually employ?
5. What kind of food do you often prepare? What are the deciding factors for your food choices? How do your meals guarantee adequate nutrition for your family?
6. How does climate change affect your family's food security?
7. How does food insecurity affect, or how has it affected, your health and wellbeing and that of your family?

### 2.3. Data Analysis

A qualitative content analysis was carried out. This is a common approach for data analysis in the social and health sciences, and is used to systematically summarize and transform a large amount of text into a highly organized and concise summary of key findings or themes [39]. It also allows for discrepant information to be presented. As pointed out by Graneheim et al. [42], it allows for multiple approaches (inductive, deductive and abductive) to be employed during different phases of the analysis. It incorporates descriptive phenomenology (manifest content) and hermeneutics (latent content), as it allows the interpretations to vary in depth and level of abstraction. Because we were interested in understanding FI from the perspective of the study participants, an inductive approach was employed, as described by Schulz [43]. This included data familiarization, creating units of analysis, open coding, closed coding, examining the ideas making up the themes, and writing up the narratives from the subthemes and themes (see Table 3). Furthermore, various techniques were used to ensure scientific rigour (including credibility, dependability, confirmability and transferability), with a focus on triangulation (e.g., different participants, interviews and observations, with two analysts), reflexivity, peer debriefing [44–46], and constant comparison [40,43,47].

**Table 3.** Summary of the data analysis.

Closed Coding	Themes	Subthemes
Being subject to poverty; Being constantly conscious of the everyday struggle; Being shocked about food price going up	Lived experiences of FI	Episodes of household FI; Perceived causes of household FI
Difficulties of putting food on the table; Saving money and food for the next meal; Having no options	Coping strategies used in situations of FI	Coping with household FI; Being aware of risky coping strategies for FI
Using available resources; Rationalizing between food prices and quality of food; Being innovative in food preparation	Food choices	Frequently consumed food and associated factors; Choosing and preparing foods for adequate nutrition
Changing market trends; Food chain disruptions; A decline in food production and loss of livelihoods	Climate change and food security	Perceived effects of climate change on household food security
Being physically and emotionally hurt; Being mentally challenged; Being diagnosed with poor health	Food insecurity and perceived health	Perceived effects of household FI on health

#### 2.4. Ethical Approval

The study protocol was approved by the Institutional Committee of Bioethics in Health of the Faculty of Medicine, Eduardo Mondlane University, Maputo (ref. No. CIBS FM&HCM/036/2019). Informed consent was obtained from each participant prior to the data collection, and all ethical requirements (e.g., voluntariness, confidentiality, anonymity) were followed.

### 3. Results

The results of the study are presented as five themes: (a) lived experiences of food insecurity, (b) coping strategies used in situations of food insecurity, (c) food choices, (d) climate change and food security, and (e) food insecurity and perceived health. Overall, the participants experienced FI in a wide range of severities depending on their socioeconomic circumstances. They used a number of strategies to deal with household FI. Furthermore, the participants reported various negative health outcomes.

#### 3.1. Lived Experiences of Food Insecurity

##### 3.1.1. Episodes of Household Food Insecurity

Wide ranges of lived experiences and severities of household FI were described by the study participants. Food insecurity was viewed mostly as being synonymous with hunger or food insufficiency; it was described as a very devastating experience and a recurring issue for most households. One interviewee described her family's food situation as follows:

*I'm almost a single mother (e.g., the participant's partner occasionally makes a financial contribution) with two dependent daughters. Whenever I go out, the older one wants to come with me [ . . . ]. This is because of hunger we experience here. At least, when we visit a friend or family, we might be offered something to eat, which is a great help. I always think of the older girl whenever I don't take her with me. If possible, I just put what they serve me in the bowl and take it home. (Participant 9)*

Another interviewee reported that his family's food situation was much better at present, and that they only had some issues related to food integrity and quality:

*I was unemployed for years and used to work very hard to get food for the family. It was normal for us to go the whole day without eating anything. I remember once, we used to raise pigs, a church mother sent her daughters with a lot of food from the night before to give to the pigs, but the kids had to heat the food for themselves. I don't forget how much we suffered at that time. Thank God none of our kids dropped out of school, and our food situation is much better now [ . . . ]. At no time now do we feel compelled to eat food without any quality. (Participant 7)*

##### 3.1.2. Perceived Causes of Household Food Insecurity

From the participants' perspective, there are many causes of FI, with the most common being extreme poverty (due to a lack of employment, job loss or financial instability), very low income (precarious work or not having a permanent job), high food prices, the COVID-19 pandemic, illness (epilepsy, stroke, diabetes), household size and dependency ratio, low education, habitation issues, pregnancy, and corruption. One interviewee expressed his thoughts as follows:

*We are poor and need to buy everything in the market, but the food prices are unreasonable; to worsen our situation, I've been unemployed for years and it's hard to find a new job at my age. Also I didn't study enough. The reality is, we can't afford a good meal even for a day. We have to work hard every day to put food on the table. (Participant 15)*

Another participant explained that his family struggles on a daily basis to put food on the table and pay the rent:

*It has been a daily struggle for us to keep up with rent payments and buy food for the family. The house owner lives off the rent, and we can't eat properly while we owe him rent. This struggle gets worse with pregnancy and children. When you live with a woman everybody expects you to have children, they don't care whether you're able to feed them and educate them properly. (Participant 12)*

For some household heads, the causes of FI included the premature loss of parents, climate change (e.g., extended droughts and, hence, a decrease in food production), food adulteration, deficiencies in the food chain and in food production, storage and transportation issues, and a lack of integrated markets. One participant said:

*My life course changed when my father passed away. I was still very young, doing primary school. My mother had a small convenience store. My uncles helped out for a few weeks, and then we were left alone. It was very painful to become suddenly invisible. I couldn't finish my schooling and had to get married early because of hunger. (Participant 13)*

Another participant explained that there are some contradictory reasons for household FI:

*We have fertile lands in Mozambique, but don't make a proper use of them [ . . . ]. Like, it often happens that we have a good harvest, but we're forced to sell our produce at the lowest price because we don't have storage facilities or there are no alternative ways to process or transport our produce. (Participant 7)*

### 3.2. Coping Strategies Used in Situations of Food Insecurity

#### 3.2.1. Coping with Household Food Insecurity

Food-insecure households are often forced to use a number of strategies to cope with the lack of food at home. These strategies may indicate the vulnerability of the household, and may vary depending on various factors (e.g., socioeconomic status, education level, socio-cultural context). In this study, the participants suffered from moderate-to-severe FI. Regardless of the specific characteristics of each household, there was a wide range of responses and strategies which were used to cope with FI. We identified 22 coping strategies used in situations of household FI, with the most common ones being cooking whatever is available, skipping meals, receiving money or food from friends and relatives, eating unsafe and low-quality foods, taking on additional work, cooking least-preferred foods, having a monotonous and less-nutritious diet, and reducing the costs of meal preparation (see Table 4).

From the responses of many participants, the extent to which households are compelled to use all sorts of strategies to cope with FI was evident. A participant explained:

*I cannot let my kids starve to death while I'm alive. I cook whatever is available at home, and we eat anything. There are no preferences here. I often send my kids to my older brother, and they like it because there is no hunger there and they eat good food. When it's just me and my husband, it's much easier to manage. I only cook once a day and we can have the same meal for days. (Participant 14)*

Another participant, explaining the need to use coping strategies, said:

*You know, I'm a hairdresser and I have a special kid (i.e., Down syndrome) and live with my mother and two younger brothers. My mother is a pensioner and also sells stuff at the market. We manage to have something on the table. I sometimes receive food and money from friends; the issue is often with the quality and safety of what we eat. When I go shopping, I search for quantity, cheaper and promotional foods and I never look at the expiry date. (Participant 5)*

As can be seen in Table 4, some households used other strategies, such as renting their own house and renting themselves a smaller house at a lower price, renting out their main house and moving into their outbuilding, begging for food or money from strangers, and putting food aside at parties and taking it home for the children. One participant expressed her thoughts as follows:

*Because of my husband's precarious work contract (i.e., not having a permanent job), we had problems paying the school fees [ . . . ] and buying food. So we had to rent out our house in the city for a good price and came to rent this house for a low price. Still, we had to make some changes to what we eat on daily basis. Whenever I'm a party, for instance, I always put some food in my bowl and take it home for the children. (Participant 14)*

**Table 4.** Coping strategies used in situations of household FI.

	<b>N = 16</b>
1. Cooking whatever is available	9
2. Skipping meals	9
3. Receiving money or food from friends or relatives	9
4. Eating unsafe and low-quality foods	7
5. Taking on additional work	6
6. Cooking least preferred foods	5
7. Having a monotonous and less nutritious diet	5
8. Reducing meal preparation costs	4
9. Reducing food intake and re-allocating food to others in the household	3
10. Sending children to relatives	3
11. Reducing spending on the children's education	3
12. Reducing clothing and beverage expenses	3
13. Borrowing money from friends or relatives	2
14. Putting food in a bowl at parties and taking it home for the children	2
15. Having multiple sexual partners or engaging in commercial sex	2
16. Receiving food from the mosque	1
17. Sending children to work	1
18. Renting a room or an outbuilding	1
19. Selling household appliances and furniture	1
20. Renting one's house and renting a smaller one for oneself at a lower price	1
21. Renting out one's main house and moving into one's outbuilding	1
22. Begging for food or money from strangers	1

### 3.2.2. Being Aware of Risky Coping Strategies for Food Insecurity

The participants were asked whether they were aware that some coping strategies could be harmful to their health. The results indicate that most were aware but could not afford to do otherwise. For most households, such strategies included eating low-quality and unsafe food, and having a monotonous and less-nutritious diet.

*I know some actions are harmful by nature, but it would be disastrous if we responded otherwise. Between starving to death and using extreme measures, we choose to live. For instance, I once found out that my neighbour had just buried a chicken that died unexpectedly; I didn't think twice, I simply dug the chicken up and asked him to give it to me the next time. (Participant 11)*

From the participants' responses, it was clear that they were aware of the risks involved in their coping strategies, but had no other options. In situations of extreme poverty and FI, the participants ate for basic survival, ignoring food quality and safety concerns.

*In our condition, nobody thinks of health issues related to consuming bad food; the only thing that matters is survival. We learn to eat anything, the body learns to adapt. A*

*number of people here live off the garbage dumps. Everyone knows this, including the government. What's strange is that the government acts as if we're here because we want to be here; they don't create conditions for us to leave this place. (Participant 15)*

The coping strategies of other interviewees included having multiple sexual partners and engaging in commercial sex as a way to get money for food. These strategies increased the risk of contracting HIV/AIDS, as was described by one participant:

*We are a huge family of four women besides our mother; each of us has at least one kid. We all have menial jobs. I and my twin sister have always had multiple sexual partners. A few years ago I found out I'm HIV-positive. Strangely, my twin sister last year found out she's HIV-positive too. (Participant 4)*

Likewise, food insufficiency, the strategies adopted, and other life challenges contributed to creating a non-conducive atmosphere at home. This affected the children especially, as one interviewee explained:

*I live with my partner and two daughters. He's unemployed and does some odd jobs. We have serious issues with food and paying the rent. Because of this, we have developed an unusual relationship. He engages sexually with other women, I don't care, and I myself engage in commercial sex, and he doesn't care either. This is not good for my kids, but I feel compelled to do that. (Participant 9)*

### 3.3. Food Choices

#### 3.3.1. Frequently Consumed Food and Associated Factors

With regard to frequently consumed food, most of the households revealed that they consume cereals (usually *xima*, rice, and pasta usually *polana* or *bela*), legumes (common beans, cowpeas, peas), bread, sweet potato, cassava and tapioca, vegetables (usually collard greens, *cacana* (*Momordica balsamina*), *tseke* (*Amaranthus spinosus*), sweet potato leaves, cabbage, cowpea leaves, lettuce), fruits (mostly seasonal fruits such as *mafura* (*Trichilia emetica*), mango, avocado, *maphilua* (*Vangueria infausta*)), fish (mostly frozen horse mackerel, kelee shad, grey mullet, tilapia and hake), processed meat (mostly polony and sausages) and chicken. Food availability (their own production or food donations from relatives or friends), affordability, price per quantity, and whether a food is energy-dense and/or nutrient-dense appeared to be key factors for food choices among food-insecure households.

*We usually eat bread, rice, kelee shad, grey mullet, collard greens, tseke and cacana and lettuce salad, but sometimes we have salad made from cowpea leaves. These foods are available at a low price; fish, tseke and cacana are very good for health. But we prefer pork with xima, just that pork is expensive. We often buy it on festive days and sometimes when we get paid, or we get some from relatives. (Participant 4)*

Another participant explained her thoughts as follows:

*We mainly consume rice or xima with beans, collard greens, tseke, horse mackerel, kelee shad, grey mullet and chicken. We use sweet potato and bread for breakfast. When buying food, I first check the price, and whether they are calorific and also nutritious foods. Sometimes, I consider the children preferences, but mostly I can't for economic reasons. (Participant 10)*

#### 3.3.2. Choosing and Preparing Foods for Adequate Nutrition

When the households were asked how their food choices and preparation could ensure adequate nutrition for the household, the responses indicated that the majority of participants had knowledge about the essential food types, but often their knowledge could not be translated into balanced meals for financial reasons. One participant expressed her thoughts as follows:

*This is a difficult task, but I think of whether my meals stay longer in the stomach, whether they give energy. I think a little of everything, whether I have fish or vegetables. But*



*unfortunately, I often don't have the ingredients I need. For instance, I prefer to make xima, instead of plain rice, with chicken legs in tomato sauce or sweet potato leaves or tseke. (Participant 6)*

Another participant explained how she tries to balance meals when preparing the household food:

*I cook whatever is available at home. Whenever possible, I make sautéed rice with chicken or plain rice with peanut curry and add fried fish. The kids don't like xima, but it is healthier than rice. Our meals are usually accompanied by a salad, often lettuce, but sometimes cabbage or cowpea leaves. (Participant 10)*

### 3.4. Climate Change and Food Security

#### Perceived Effects of Climate Change on Household Food Security

Most of the household heads recognized that climate change was affecting their food security directly or indirectly. They listed a range of situations caused by climate change that could contribute to a rise in FI. These included food shortages, a rise in food prices, a decline in food production, changes in rain patterns, extended droughts, outbreaks of agricultural pests, a decline in soil fertility, the destruction of infrastructures (e.g., facilities for storage, processing, transportation), a decrease in livelihood opportunities, and a rise in poverty.

*We depend first and foremost on markets, but food is produced somewhere. With climate change, we may have issues related to food production and transportation, and we'll experience food shortages and rises in food prices, worsening our food situation. (Participant 8)*

One interviewee explained how her family's food security was dependent on the markets and on remittances, and how climate change could disrupt food transfers from her parents, causing her family further FI:

*Our food security depends on the markets and on remittances. My mother often sends us rice. If she doesn't have a good harvest because of drought or an outbreak of agricultural pests, we'll definitely experience bad FI in our skin. (Participant 6)*

### 3.5. Food Insecurity and Perceived Health

#### Perceived Effects of Household Food Insecurity on Health

The participants experienced multiple negative health outcomes in a vicious circle in which different conditions reinforced each other. The interviewees reported poor general health, emotional distress, hopelessness, anxiety and depression, substance use, diarrhoea, and other negative health outcomes. Some of the participants had been diagnosed with hypertension, diabetes, and HIV/AIDS, or had a household member who had been diagnosed with epilepsy or had suffered a stroke. One participant described her health as follows:

*We live in extreme poverty and hunger. I don't know what to do. It's hard to be a mother and a father. My husband has fallen into depression, he lost his job; my daughter no longer goes to school, she uses substance with her friends; she was sexually violated once and we ended up at the police station. I myself have been diagnosed with diabetes, and I'm always worried and anxious, especially when she's not home. (Respondent 11)*

Another participant explained how hunger and other challenges affected her health as well as that of the entire family:

*I was in a very abusive relationship physically and emotionally. My husband was a security guard, but spent his money on girls, drinking and eating, while I was starving with his son. We used to argue a lot because of hunger and his behaviour. With the COVID-19 pandemic, he lost his job. He couldn't cope with unemployment, he was depressed for days, and then he became a drunkard and very violent. Because of hunger, poverty, and humiliation, we had to leave him alone. (Participant 5)*

#### 4. Discussion

This study sought to investigate the lived experiences and coping strategies used by food-insecure households in southern Mozambique, and to understand the causes of FI and how FI relates to health. The findings show a clear interrelationship between household FI experiences, the coping strategies used, and food choices, as well as climate change and health.

The study identified a wide range of lived experiences and coping strategies used by food-insecure households, highlighting the severity of and households' vulnerability to FI. It should be noted that these findings must be viewed in the context of the COVID-19 pandemic. The data collection was performed in the midst of somewhat stringent measures to curb the spread of COVID-19. In any case, food insufficiency or hunger—as reported by many households—was already a recurring issue, but the COVID-19 pandemic has exacerbated the problem, and to a large extent created a scenario of the disruption of health and food systems [48,49].

In fact, a considerable number of household heads reported that their household's food situation had worsened because of the pandemic. In addition, various other factors were perceived as key causes of household FI. These factors included extreme poverty for different reasons, very low incomes, high food prices, illness (epilepsy, stroke, diabetes), the household size and dependency ratio, low education, habitation issues, pregnancy and children, and corruption. A small share of household heads also mentioned climate change and soil degradation, as well as the premature loss of parents, food adulteration, non-integrated markets, deficient food production, and storage and transportation issues. These results are indicative of how dynamic and complex the issue of FI is, and they call for joint and coordinated efforts from various actors—namely the government, the private sector, civil society, international institutions (e.g., the World Bank and the International Monetary Fund), and communities—in order to stimulate decent work and build an inclusive economy [50,51]. Moreover, these findings suggest the need to provide social and economic support to the most vulnerable groups [52,53].

In this study, the participants reported corruption as one of key causes of household FI. The burden of corruption has been acknowledged nationwide as negatively affecting the national budget, the economy, business development, and socioeconomic development and welfare [54]. The government of Mozambique, civil society and international institutions have highlighted for decades the need to combat corruption, but corruption is at the very heart of the current political crisis [55]. Research evidence indicates that corruption is a living reality at all levels of administration [55,56]. Recently, a huge corruption scandal related to undisclosed international loans involving the political and economic elite was exposed [55,56], and the Centre for Public Integrity declared that the government is incapable of adopting concrete measures to combat corruption [57]. Along the same lines, the administrative court of Mozambique announced on 6 April 2022 that the money (equivalent to USD 700 million) the country received from international partners during the COVID-19 pandemic had been misused, and civil society demanded accountability [58].

In addition, food production deficiency, soil degradation and climate change have been reported as factors contributing to household FI. In fact, agriculture is supposed to lie at the core of food security and nutrition in Mozambique. However, as was pointed out by Kidane et al. [59], the country's agriculture is characterized by substantial exposure to external risks to crop production. Compounding these risks are climate change, soil degradation, and soil fertility decline. Soil degradation is a major problem that threatens the sustainability of crop and livestock productivity systems [60]. In cropping systems, suboptimal management practices are among the key drivers of soil degradation and the decrease in soil fertility. About 65% of agricultural land in SSA has been classified as "degraded", which is acknowledged as a major underlying cause of low crop productivity and the high prevalence of malnutrition [60]. It has been argued that the agricultural practices adopted to feed its growing population are the primary cause of soil degradation in

SSA [61]. Therefore, there is a need for the development and implementation of appropriate policies which are suitable for conservation agriculture [59,62–64].

Despite this need, African countries—including Mozambique—have been extremely slow in policy implementation. It has been argued that there is lack of political will and commitment [65,66], and that people have somehow been complacent to this unfolding disaster [67]. As pointed out by former WHO Director-General Margaret Chan, the world's struggle is not due to a lack of learning and solutions, but to a lack of actions to implement solutions [67]. The urgency of FI in Africa demands joint and coordinated efforts from all sectors (e.g., government, the private sector, civil society, international organizations) [51,68,69]. On the other hand, rapid population growth is a serious challenge that has been overlooked [1,70]. However, it is not possible to successfully address FI and malnutrition without considering the rapid population growth. According to Hall et al. [71], the projected rapid population growth will be the leading cause of FI worldwide by 2050.

With regard to coping strategies, the participants reported a wide range of responses for the acquisition and management of food. In agreement with our findings, Muderedzi et al. [72] found that, despite awareness of the related health risks, women in Tonga communities often adopted sexual (as well as non-sexual) coping strategies in order to obtain food for their families because of extreme poverty and food insufficiency. A study by Anater et al. [16] found that food-insecure individuals resorted to inadequate nutrient intake, the consumption of unsafe foods, and engaging in illegal activities and financially and physically risky and stigmatized behaviours (e.g., gambling, commercial sex, eating other people's leftovers). In the present study, almost every household had compromised food quality and food safety because of FI. Similar results have been found among food-insecure households not only in SSA [73] but also in Malaysia [74], the USA [75], Canada [76], and Australia [77]. Hwalla et al. [78] argue that food quality and safety as an "integral component of food security" should be embedded within all of its four pillars. However, previous efforts to address food security in the Middle East and North Africa had focused on availability, and had overlooked the other three dimensions, leaving nutritional considerations aside [78].

Food-borne diseases are of great concern today. As an example, in March 2018, the Mozambican National Inspectorate for Economic Activities (INAE) apprehended 14,000 tonnes of processed, ready-to-eat meat sausages from South Africa which were suspected of contamination by *Listeria monocytogenes*. However, some stores continued to sell these products, despite the fact that consumption was discouraged because of health risk concerns [79]. It is noteworthy that processed meat sausages were among the most frequently consumed foods in this study. According to Grace [19], most of the known burden of FBD comes from the consumption of fresh foods sold in informal markets. In addition, structural challenges (e.g., the fragmentation of the food system and deficient monitoring) allied with the poor capacity of the public institutions responsible for regulatory enforcement compound this situation [19,80]. There is also a concern about the presence of chemicals in food [81]. Moreover, aflatoxins are pervasive in crops in tropical and subtropical regions, especially maize and groundnuts. They are also found in dairy products and traditionally fermented foods [19], and several other commodities [20]. The ingestion of large amounts of aflatoxin can cause death [19], and chronic exposure can lead to liver cancer [19,21].

Likewise, food adulteration is a serious challenge that compounds food quality and safety issues, resulting in outbreaks of food poisoning; food adulteration was reported in this study. Food fraud also occurs at other levels in the value chain (e.g., involving the producers or retailers) [19,80]. Retailers may change the expiration dates of packaged foods, thus increasing the risk of the consumption of unsafe food [80]. Moreover, accidental contamination is likely to be more common in LMICs as a result of a lack of stringent health and safety protocols [19]. For instance, in a rural town in Mozambique, on 9 January 2015, a total of 234 individuals became sick, 75 of whom died of an illness linked to drinking *pombe*, a traditional alcoholic beverage made from corn flour [82]. A systematic review by Gizaw [83] found that microbial and chemical contamination, food adulteration, the

misuse of food additives, mislabelling, genetically modified foods, and outdated foods were common health risks related to food safety in the food market. Therefore, the author called for effective food control systems not only to protect the health and safety of the public but also to assure the safety and quality of imported foods [83].

Health is one of key challenges that food-insecure households face because of their inability to meet their nutritional needs due to financial constraints [75]. In fact, we noted that most household heads had knowledge about nutritional needs; however, for financial reasons, this knowledge often could not be translated into balanced meals. In addition, the participants consistently admitted that they could not afford to think of potential health issues related to the food they consumed. In other words, because the household heads had no other options, they were compelled to use a number of risky coping strategies to acquire and manage food, and experienced multiple negative health outcomes in a vicious circle in which the different conditions reinforced each other. Similar results have been found across the world [12,84], across LMICs [85], and in the USA [86,87], just to name a few studies. As described above, beyond serving as indicators of economic hardships, coping strategies can pose financial, legal/regulatory, nutritional and safety, and physical risks to the person employing them, warranting significant public health attention [16,88,89].

It is noteworthy that some of interviewees reported intimate partner violence (IPV) and child marriage, and also reported poor academic performance and school dropout among the members of their household. Regarding the first, the literature reports a wide range of negative consequences of IPV (e.g., miscarriage, depression, post-traumatic disorder) [90], and in one study, poverty and household FI were found to be key drivers of IPV among women in South Africa [91]. Regarding the child marriage, this is linked to a number of health risks and low educational attainment. Poverty and social norms are considered core drivers of child marriage in LMICs [92]. These findings reinforce the need for social protection and the implementation of multifaceted programmes to combat household FI [93].

#### *Strengths and Limitations*

This is the first qualitative study conducted in Mozambique that provides rich information, not only on the lived experiences and coping strategies of households in situations of FI but also on their understanding of potential causes of FI and how FI relates to perceived health. This study highlights the deep impact of FI for households in southern Mozambique. Likewise, the study was able to identify and include participants from diverse backgrounds who provided valuable insights. Nevertheless, the study has some limitations that need to be acknowledged. For instance, the study consisted largely of female participants. In addition, the findings cannot be generalized to households in other urban communities or to the country as a whole.

#### **5. Conclusions**

This study investigated the lived experiences and coping strategies used by households in situations of FI, and it attempted to understand the causes of FI in southern Mozambique and how FI relates to negative health outcomes, according to people directly affected by FI. The participants reported a wide range of experiences and coping strategies to acquire and manage food, highlighting the hardships that households go through and how they try to minimize exposure to FI. A number of factors were perceived to be key drivers of FI, with the main ones being extreme poverty, very low incomes, high food prices, the COVID-19 pandemic, illness, the household size and dependency ratio, a lack of education, habitation issues, pregnancy and children, and corruption. Furthermore, the participants experienced multiple negative health outcomes which strengthened household FI and exacerbated health problems. The interviewees reported emotional distress, hopelessness, anxiety and depression, and other negative health outcomes. Some interviewees had diagnoses of hypertension, diabetes, and HIV/AIDS, or told us about a household member who had been diagnosed with epilepsy or had suffered a stroke. These findings suggest that future

research (e.g., longitudinal quantitative study) is needed in order to ascertain causality. Moreover, the findings call for job creation and women's empowerment, as well as the implementation of appropriate policies and health programmes to alleviate FI and improve health outcomes among the most vulnerable groups. Likewise, the findings suggest the need for joint and coordinated efforts from various actors (e.g., government, the private sector, civil society and international institutions), as well as the need to rethink future actions towards local, regional and global food security.

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