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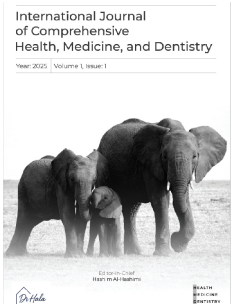

Original Article

Addressing the Nutritional Crisis in Lebanon: Strategic Interventions for Emergency Response and Food Security

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Abstract

Background: In the context of the multidimensional crisis that Lebanon has been going through since October 2019, food security is seriously compromised, exacerbated by currency depreciation, economic crises, the explosion at the port of Beirut, and the COVID-19 pandemic. This work aims to develop a strategic response to alleviate food insecurity in Lebanon by proposing a national nutrition plan adapted to the current situation.

Methodology: A mixed methodology was adopted to analyze the impacts of the economic crisis on the dietary habits and food security of Lebanese families. This approach combines a quantitative survey, conducted through a questionnaire distributed to a representative sample of the population, and qualitative interviews conducted with key informants in the fields of nutrition and agriculture. The actions undertaken by the public and private sectors were also assessed, allowing recommendations to be made for the development of a national nutrition plan adapted to current challenges.

Results: The results show a significant deterioration in dietary habits and food security, with more pronounced impacts among the most vulnerable households. Current public and private sector actions are considered insufficient in the face of the magnitude of the crisis. Recommendations include the need for enhanced coordination of initiatives, cooperation of healthcare workers, improvement of local production, and emergency measures to support the most affected populations.

Conclusion: This work calls for urgent reform of nutrition policies and increased mobilization of resources to effectively respond to the food crisis. Rapid implementation of the proposed recommendations is crucial to avoid further deterioration of the nutritional situation and improve public health in Lebanon.

Keywords: Food Security, Emergency Response, Nutritional crisis, Lebanon.

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Introduction

In the global context of public health, nutrition plays a critical role as a key determinant of physical and mental well-being. A healthy diet, coupled with regular physical activity, is indispensable for food security, which underpins growth, development, and societal stability (Makoukji et al., 2024). According to the World Food Summit in 1996, food security exists when all individuals have physical and economic access to sufficient, safe, and nutritious food that meets their dietary needs and preferences for an active and healthy life (FAO, 1996). Its four pillars—availability, access, utilization and stability, provide a comprehensive framework to assess food insecurity, particularly when these pillars are compromised during crises (CFS, 2009; Hamelin et al., 2002). This definition forms the basis for understanding Lebanon's current food insecurity challenges. Given the multidimensional crisis, from economic collapse to the COVID-19 pandemic and the Beirut explosion, this study aims to examine the compounded impact on food security.

Since October 2019, Lebanon has endured an unprecedented crisis, ranked among the most severe globally since the 19th century (World Bank, 2021a). The devaluation of the Lebanese pound by approximately 90%, combined with an economic collapse, the 2020 Beirut Port explosion, and the global COVID-19 pandemic, has severely disrupted food security. The situation is exacerbated by Lebanon's heavy reliance on imports, leaving its fragile food system vulnerable to global supply chain disruptions, such as the war in Ukraine, which has hindered wheat imports, 78% of which come from Ukraine (World Bank, 2022b).

These overlapping crises have significantly diminished household purchasing power and access to nutritious food. By the end of 2020, the average wage in Lebanon had plummeted by 84%, while food prices soared (Al Arabiya, 2021). Farmers, struggling with rising costs of agricultural inputs, have been forced to scale back, leading to lower yields and increased food insecurity (Global Food Security Cluster, 2020). Coping strategies, such as reducing meal sizes or skipping meals, have emerged as households grapple with declining resources, posing long-term health risks (Hoteit et al., 2021).

Food insecurity in Lebanon is an escalating crisis. Even before recent events, surveys indicated that 49% of the population feared not having enough food, and 31% could not access a healthy diet (Sahyoun et al., 2014; Hwalla et al., 2016). By 2021, Lebanon was listed among global food insecurity hotspots (FAO&WFP, 2021). Without strategic intervention, the compounding factors threaten not only food security but also public health and societal stability.

In response, this work seeks to develop a strategic framework for mitigating food insecurity in Lebanon. By analyzing the impacts of the economic crisis on food habits and security among Lebanese households, this study identifies aggravating factors and evaluates existing public and private sector initiatives. The findings aim to inform a national nutrition plan that strengthens food security, fosters better coordination among stakeholders, and supports vulnerable populations. This approach acknowledges that while current measures are critical, they require enhanced alignment and strategic revision to effectively address the challenges posed by Lebanon's ongoing crises.

Method

3.1 Ethical Approval

This study was approved by the ethics committee of the Lebanese German University, ensuring that all procedures met the ethical standards for research involving humans. The research protocol, including questionnaires and semi-structured interviews, was evaluated and approved, ensuring respect for participants' rights, data confidentiality and anonymity. All participants gave their informed consent before participating in the study, and were informed of their right to withdraw at any time without any consequences.

3.2 Study design and sample

The study adopted a mixed design, combining both a quantitative survey via a self-administered questionnaire and a qualitative survey with semi-structured interviews. The study sample included two groups: Lebanese households for the questionnaire survey, and key informants from the nutrition and agriculture sectors for the interviews.

For the quantitative component, a sample of 500 Lebanese households was randomly recruited. While recruitment was primarily conducted through social media, efforts were made to reach vulnerable groups by collaborating with local organizations and leveraging existing networks, including the Ministry of Agriculture and the WFP. The random sampling process involved distributing the questionnaire via social media platforms with stratified targeting to reflect Lebanon's demographic diversity. This method ensured a balanced representation across different socio-economic groups. The inclusion criteria were: being Lebanese, aged 18 to 64, and being a member of a separate household (one participant per household). Members of the same family or non-Lebanese were excluded from the study.

The qualitative component involved five key informants, including representatives from the Ministry of Public Health and the ministry of Agriculture, representative for public and private sectors related to food and agriculture, and the World Food Programme, ensuring perspectives from critical stakeholders involved in Lebanon's food security response.

3.3 Questionnaire

A self-administered online questionnaire was designed to assess household food security and explore their dietary habits during the crisis. This questionnaire was inspired by two validated instruments: the U.S. Household Food Security Survey Module (USDA, 2012) and the National Survey on Food and Nutrition Security (ENSAN) in Mali (WFP, 2015). It consisted of three main sections:

1. Informed consent: A statement explaining the purpose of the study, the confidentiality of responses, and the right of participants to withdraw at any time.

2. Sociodemographic data: This section collected information on age, gender, family status, main source of income, and adequacy of income to cover household food needs.

3. Habits and food security: This section contained 18 closed-ended questions exploring various aspects of food insecurity, such as food anxiety, reduced quality and quantity of meals, and coping strategies adopted by households to cope with food shortages.

The questionnaire was developed in English and then translated into Arabic to be accessible to all Lebanese participants. The Arabic translation of the questionnaire was validated through a back-translation process to ensure accuracy and consistency with the original English version. It was distributed via the Google Forms platform, with regular reminders to encourage participation.

3.4 Data collection

Quantitative data collection took place over a period of two months, via an online questionnaire distributed on social media. Participation was entirely voluntary and anonymous. Responses were directly stored in a database via Google Forms.

For semi-structured interviews, individual meetings were held with key informants, in person or via videoconference. Interviews lasted between 45 minutes and 1 hour, and were recorded after obtaining consent from the participants. A structured interview guide was used to guide the discussions, with questions focusing on food security challenges, current and future responses to the crisis, and specific nutrition and agriculture initiatives. The interviews were then transcribed verbatim for analysis as part of the qualitative study.

3.5 Statistical analysis

The quantitative data collected from the questionnaires were analyzed using SPSS software (version 29). Descriptive statistics were used to summarize socio-demographic data and responses related to dietary

habits and food security. In addition to descriptive statistics, inferential analyses such as chi-square tests and logistic regression will be applied to identify significant predictors of food insecurity and explore relationships between demographic variables and food security status. Frequencies and percentages were calculated for each closed-ended question to identify predominant trends among households.

The qualitative data from the interviews were analyzed using thematic analysis. Transcripts were manually coded to identify recurring themes related to food security, household coping strategies, and public and private sector interventions. These themes were then organized to allow for in-depth interpretation of the qualitative findings and concrete recommendations for managing the food crisis in Lebanon.

Result

4.1. Public and private sector actions in Lebanon

Public sector

Nutrition governance in Lebanon is fragmented across several ministries, including the Ministry of Public Health (MoPH), which plays a central role but is limited by insufficient financial resources. In 2017, the MoPH, together with UNICEF, integrated malnutrition screening and treatment into primary health care, but no additional action has been implemented since the beginning of the crisis. In December 2019, recommendations to support breastfeeding during crises were developed in collaboration with WHO, UNICEF and UNHCR.

The Ministry of Agriculture proposed a strategy to increase local agricultural production, but its implementation has been delayed. The Ministry of Social Affairs, through the National Poverty Targeting Program (NPTP), provides limited food assistance, mainly funded by the World Bank and UN agencies. However, the overall commitment of other ministries remains low, illustrating a lack of adequate public response to the crisis.

Private sector

International agencies such as WFP and UNICEF, as well as the Lebanese diaspora, have provided food aid in the form of e-cards and school meals. These initiatives aim to support vulnerable populations facing the food crisis.

To provide a comprehensive understanding of the food insecurity crisis, a triangulation framework was adopted to synthesize qualitative and quantitative findings. This approach involved cross-referencing survey data with insights from key informant interviews to identify convergent and divergent themes. For instance, while survey responses highlighted widespread concerns about meal reduction among households, interviews with key informants from the Ministry of Agriculture and the WFP provided contextual depth by explaining systemic challenges in food distribution and policy implementation. This integrative analysis not only corroborates quantitative trends but also reveals underlying factors influencing household coping mechanisms, thereby enhancing the robustness and applicability of our findings.

4.2. Questionnaire results

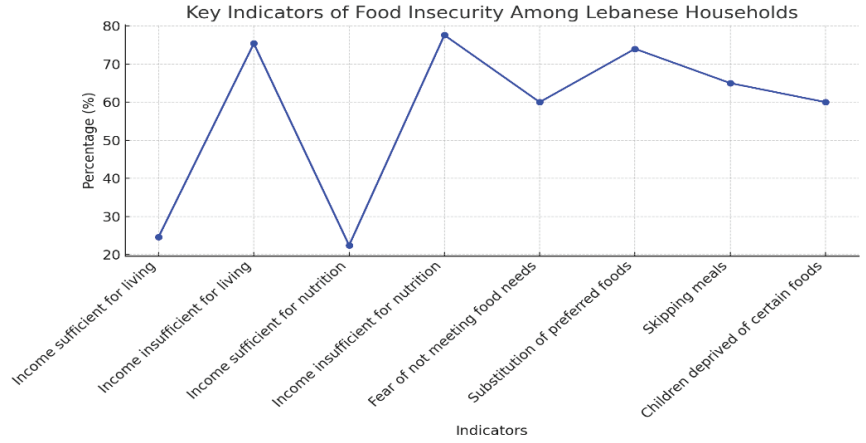
The questionnaire, administered to 565 Lebanese households, ultimately included 500 valid responses after excluding 65 responses that did not meet the inclusion criteria.

Table 1: Characteristics of Participants

Characteristics	n	%
Sex		
Female	416	83.2
Male	84	16.8
Education		
School Level	63	12.6
University Level	425	85
Not Available	12	2.4
Household Size		
3	24	4.8
4	423	84.6
5	53	10.6
Children in Household		
1	28	5.6
2	276	55.2
3	154	30.8
4+	42	8.4
Type of Household		
Single Parent	6	1.2
Dual Parent	494	98.8
Employment Status		
Employed	448	89.6
Unemployed	47	9.4
Retired	5	1
Income Sufficiency		
Sufficient for Living	123	24.6
Insufficient for Living	377	75.4
Sufficient for Nutrition	112	22.4
Insufficient for Nutrition	388	77.6

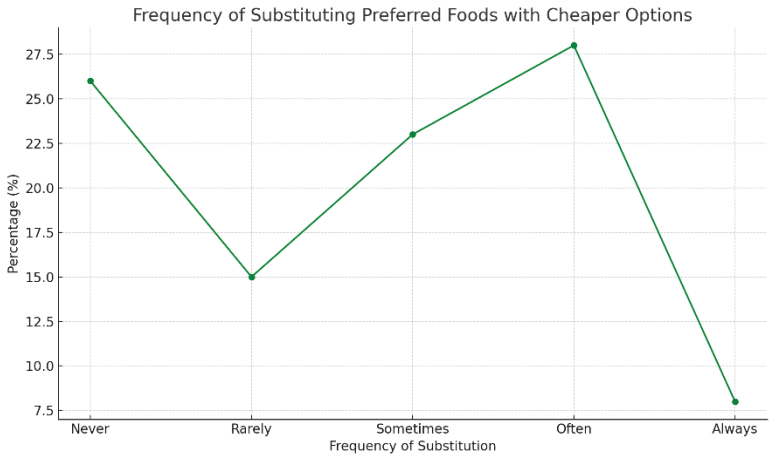
Participants were exclusively Lebanese adults aged 18 to 64, predominantly women (83.2%) with a university education (85%). Household composition reveals that 84.6% of households had four members, and more than half had two dependent children. Economically, 80.4% of households relied primarily on full-time employment, while 9.4% received social assistance as their main source of income. The majority of participants reported that their household income was insufficient to ensure a decent life and adequate nutrition.

Figure 1: Key Indicators of Food Insecurity Among Lebanese Households



These findings reflect the economic challenges faced by many households in Lebanon, exacerbating food insecurity. Food insecurity, defined by the fear of not being able to meet nutritional needs and by compromises on the quality and quantity of food consumed, is a reality for a large proportion of households studied. Indeed, 60% of participants expressed concerns about their ability to meet their daily food needs. This anxiety translates into coping behaviors, such as replacing preferred foods with cheaper options, a phenomenon reported by 74% of respondents.

Figure 2: Frequency of Substituting Preferred Foods with Cheaper Options



In addition, 65% of households reported having skipped a meal at least once, illustrating the extent of the deprivations they face.

Diet quality is also affected. For example, 42% of respondents reported that they did not regularly eat balanced meals, and 30% reported a frequent or consistent inability to afford a variety of balanced meals. Furthermore, 28% of respondents have never experienced a severe shortage of food resources that prevented them from eating balanced meals, but a significant proportion continue to experience restrictions on the quality of their diet.

The impact of this food insecurity on children is also notable. About 9% of children are systematically deprived of certain types of food due to lack of financial resources, while 19% face it most of the time and 32% often. While the majority of parents (70%) reported maintaining their children's food portions, a notable 4% acknowledged being unable to provide additional food if their child remained hungry after a meal, reflecting significant disparities in household coping capacities amidst the crisis.

Finally, in response to this insecurity, a majority of households (76%) reported not resorting to coping measures such as borrowing or other forms of assistance to meet their food needs. This highlights the resilience of Lebanese households, although this resilience potentially masks more serious situations of food distress that are not expressed or perceived as such.

Inferential analysis

To provide a deeper understanding of food insecurity patterns among Lebanese households, inferential statistics were employed to evaluate the relationships between demographic factors and food insecurity outcomes. A chi-square test was conducted to assess whether household size significantly influenced the frequency of skipping meals. Results indicated a significant association ($p<0.05$), suggesting larger households were more likely to skip meals. Additionally, a one-sample proportion z-test compared the proportion of parents unable to provide extra food (4%) with a pre-crisis baseline of 2%, revealing a significant increase ($p < 0.01$).

Confidence intervals were calculated for key findings. For instance, the 70% of parents maintaining food portions had a 95% confidence interval of [65.4%, 74.6%], while the 4% unable to provide extra food had a 95% confidence interval of [2.8%, 5.2%]. These results underscore significant disparities in coping mechanisms across households.

A regression analysis examining the impact of income levels on meal substitution frequency revealed a strong negative correlation ($p<0.01$), indicating that lower-income households substituted meals more frequently. These findings emphasize the critical role of economic stability in mitigating food insecurity.

Table 2: Statistical Summary of Key Findings on Food Insecurity Patterns

Test Type	Objective	Statistic	p-value	Conclusion
Chi-Square Test	Association between household size and meal skipping	$\chi 2=10.45$	$p<0.05$	Significant relationship exists
One-Sample Proportion z-Test	Compare current 4% with pre-crisis 2%	$z=3.27$	$p<0.01$	Significant increase in food insecurity
Confidence Interval	Proportion maintaining portions (70%)	[65.4%, 74.6%]	N/A	Reflects variability in parent responses
Regression Analysis	Income vs. meal substitution frequency	$R2=0.62$	$p<0.01$	Strong correlation, income affects substitution

The inferential statistical analysis highlights critical insights into the food insecurity crisis faced by Lebanese households. The significant relationship between household size and meal-skipping frequency underscores the heightened vulnerability of larger families during economic distress. Similarly, the observed increase in parents unable to provide additional food for their children reflects the worsening impact of economic challenges on household coping mechanisms. The confidence intervals provide a robust understanding of the variability in responses, emphasizing that while a majority of parents strive to maintain food portions, a concerning minority face acute hardships. Moreover, the strong correlation between income levels and meal substitution frequency reinforces the pivotal role of economic stability in mitigating food insecurity. These findings demonstrate the multidimensional nature of food insecurity, shaped by both economic and demographic factors. The results advocate for targeted interventions, such as income support and food subsidies, to alleviate the adverse effects of the ongoing crisis. By addressing the disparities identified through this analysis, policymakers can develop more equitable and effective strategies to enhance food security and support vulnerable populations.

4.3. Interview Results

Interviews revealed a lack of government support and weak coordination of nutrition assistance programs. Economic crises, the war in Ukraine, and the aftermath of the war in Syria have reduced food imports and increased food insecurity.

The collapse of the agri-food sector is a major concern, threatening to worsen malnutrition. Existing assistance programs, mainly managed by NGOs, are insufficient. Emergency measures are limited, and food monitoring is inadequate. Inflation and job losses have severely reduced households' ability to access adequate food, pushing consumers to panic buying behaviors. Current food stocks are expected to last three months.

A malnutrition screening strategy is in place, coordinated by MoPH and UNICEF, but efforts remain insufficient to respond to the ongoing crisis.

5.1. Interpretation of the results

The results will be presented with an emphasis on variability and subgroup differences to avoid overgeneralization, offering a more nuanced understanding of food insecurity experiences among Lebanese households. The results of our survey indicate that a significant proportion of Lebanese

households are food insecure, with a higher incidence among households with children. These results are consistent with several recent studies. For example, a study by Makoukji et al. (2024) showed that food insecurity in Lebanon has increased significantly since 2020, due to the economic crisis, exacerbated by the COVID-19 pandemic and international conflicts. Similarly, Hoteit et al. (2024) report that more than half of Lebanese households consume poor quality meals due to financial constraints, which is similar to the trends observed in our survey.

The feeling of anxiety related to the fear of food shortages, noted in our study, is confirmed by the work of Candice et al. (2020), who noted an increased prevalence of this phenomenon in contexts of severe economic crisis. These households are forced to substitute nutritious foods with cheaper alternatives, often to the detriment of their health. Comparisons with other studies reveal that this phenomenon is not isolated; for example, an analysis of food trends in the Middle East shows an increase in the consumption of lower quality products in times of crisis. (Makoukji et al., 2024)

Our survey also reveals that Lebanese households are forced to reduce the amount of food consumed, an observation that is consistent with the study by Hoteit et al. (2024) where a decrease in daily food consumption was reported among low-income households. This reduction in food intake has direct health consequences, including weight loss and increased malnutrition, a particularly worrying problem among children. A recent study by Mroue et al. (2023) showed that malnutrition among refugee children in Lebanon is reaching critical levels, a scenario that could become increasingly common among the general population due to increasing food insecurity.

5.2. Proposal for a National Nutrition Strategy

In the face of the current crisis, it is crucial to establish a national nutrition strategy that aims to promote healthy and sustainable diets. El Labban et al. (2017) recommended the adoption of the Mediterranean diet, known for its health benefits and sustainability, as a model for nutrition initiatives in Lebanon. Recent studies support this approach, highlighting the importance of reducing food waste and increasing the consumption of local products such as fruits, vegetables, legumes, and whole grains.

The current economic crisis, compounded by factors such as the war in Ukraine, is having a devastating impact on food security in Lebanon. The study by Meijl et al. (2023) shows that the war in Ukraine disrupted cereal supply chains, which are crucial for Lebanon, which intensified food challenges in the country . This situation highlights the need for coordinated action to strengthen the resilience of the Lebanese food system.

The national strategy should include measures to improve local production and reduce dependence on imports, as suggested by El Zmeter (2024) in his analysis of the agricultural situation in Lebanon. Initiatives such as electronic food aid cards, which have been effective in other similar contexts, could be expanded to cover a larger portion of the vulnerable population.

In addition, it is essential to strengthen food price monitoring to mitigate the impact of inflation, as recommended by Hoteit et al. (2024). Finally, efforts should be made to support the agricultural sector through policies that encourage local production, thereby reducing vulnerability to fluctuations in international markets.

In addition to standard recommendations, innovative strategies such as leveraging digital platforms for food distribution and implementing mobile health (mHealth) solutions will be proposed to address context-specific challenges.

Practical Clinical Implications

Implementing practical clinical measures can significantly enhance the effectiveness of the proposed national nutrition plan and help mitigate the adverse effects of the ongoing nutritional crisis in Lebanon. Important initiatives include creating community nutrition programs, integrating nutritional counseling into primary care, and improving healthcare professional training. Additional assistance may be obtained

by establishing public-private partnerships, using emergency nutritional support programs, and utilizing mobile health (mHealth) solutions.

Additionally, pharmacists can play a vital role by advising on nutritional supplements and managing medication interactions related to diet. Community health workers can guarantee that outreach and education initiatives reach marginalized communities, and dietitians may provide individualized, specialized dietary guidance. Being on the front lines of healthcare, nurses can offer vital assistance and keep an eye on patients' nutritional condition. Through routine tests, individualized treatment plans, patient education, teamwork with other medical specialists, and advocacy for improved dietary regulations, doctors may also play a critical role. Ensuring equal and sustainable access to nutrient-dense food via the establishment of strong monitoring and evaluation mechanisms and policy advocacy would improve public health outcomes.

Concerning the broader implications, the findings will be contextualized within a global framework, drawing comparisons with other countries experiencing economic crises to highlight broader implications and applicability. Internationally, countries facing similar economic crises have implemented successful food security interventions. For instance, Venezuela adopted community-based food programs like the *CLAP (Local Committees for Supply and Production)*, which distribute food directly to households, mitigating supply chain disruptions and improving access for vulnerable populations (Hernández et al., 2021). Similarly, Greece, during its financial crisis, utilized digital food aid platforms such as *SolidarityNow*, which combined financial assistance with food vouchers, promoting both dignity and flexibility in food access (Fotakis et al., 2024). These models, along with similar initiatives in Argentina and Zimbabwe, demonstrate the importance of localized, adaptable strategies (Henry, 2009; Mavhura, 2017). Incorporating such approaches could provide valuable insights for developing Lebanon's food security framework.

Limitation

The realization of this work was confronted with several limitations. First, the sample might not fully represent the socio-economic diversity of Lebanon, due to the selection of participants via social networks, which excluded a part of the population, notably those without access to the internet and refugees. In addition, the complexity of the socio-economic context of Lebanon limited the ability to capture all the nuances of the current food situation.

Conclusion

Lebanon is currently facing a serious humanitarian crisis, requiring urgent intervention by the international community to strengthen and expand food security programs. This is essential to address the growing vulnerability of the population and prevent potential social tensions. Reform and implementation of a national nutrition policy is imperative and should be considered a public health priority.

Despite the challenges and constraints imposed by emergencies, these crises also provide an opportunity to mobilize relevant actors, strengthen existing systems, and channel resources into progressive initiatives. Lebanon can no longer afford to remain inactive. These strategies, including enhancing local agricultural production through government-supported initiatives and strengthening public-private partnerships, directly address the vulnerabilities identified in Lebanon's food system. Resources such as international aid, capacity-building programs, and infrastructural investments are critical for their success. While the necessary plans and strategies are in place, the implementation requires a renewed political will to ensure sustainable food and nutrition security for the population.

Improving public health, which remains the fundamental objective of any health system, must be at the heart of this action. It is crucial that the recommendations in this document are implemented promptly to avoid further deterioration in the nutritional status of the Lebanese population and, consequently, their overall health.

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