

AMERICAN UNIVERSITY OF BEIRUT

THE EFFECTS OF THE COVID-19 AND THE ECONOMIC
CRISES ON FOOD BEHAVIORS AND FOOD SAFETY IN
BEIRUT, LEBANON

by
ALIK RAFFI MESROBIAN

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ABSTRACT OF THE THESIS OF

Alik Raffi Mesrobian

for

Master of Science

Major: Food Security

Title: The Effects of the Covid-19 and the Economic Crises on Food Behaviors and Food Safety in Beirut, Lebanon

Background: Lebanon is going through a major economic crisis that has caused food prices to increase by 483% between January 2021 and January 2022 (Lebanon Food Security Portal, Brief #24). Parallel to this, globally there is the Covid-19 crisis happening, affecting Lebanon as well. This crisis made governments impose lockdowns, limiting the population's access to food. People started eating more home-cooked foods and cooking more. Both these crises happening simultaneously in Lebanon, have affected the food behaviors and food safety status of the Lebanese population.

Objectives: This study aims at identifying the major food consumption behavior changes caused by the economic and Covid-19 crises in Lebanon that are causing or preventing food-borne illnesses.

Methodology: An online survey was conducted taking as target population the parents of school-aged children. The survey population was drawn from parents of children attending three different Armenian schools associated with different socioeconomic backgrounds, in or around Beirut, Lebanon. The sample size was 266 households.

Results: Lebanon is going through major economic and Covid-19 crises that have caused changes in food behaviors and have affected food safety. The Lebanese population, regardless of their socioeconomic situation, has been seeing and feeling the effects of these crises in their day to day life. In general, higher income households systematically reported that their food purchase and consumption practices are largely unchanged from pre-crisis. Lower income households reported changes in response to crisis, including purchasing power, quality of foods... This study found significant changes in household food consumption behaviors linked to Covid-19 and economic crises. Also, throughout this study there was widespread perception that food safety has declined.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	1
ABSTRACT	2
ILLUSTRATIONS	5
TABLES.....	6
INTRODUCTION.....	7
A. Research Objectives	11
LITERATURE REVIEW.....	12
A. Food Security Definition and Pillars	12
B. The effects of the Covid-19 crisis on food behaviors	12
C. The effects of the Covid-19 crisis on food safety.....	14
D. The effects of economic crisis on food behaviors	15
E. The effects of economic crisis on food safety.....	16
MATERIALS AND METHODS	18
A. Survey Instrument.....	19
B. Survey Procedure.....	20
1. Pre-test stage: piloting	20
2. Survey administration and participants' recruitment	21
3. Statistical analysis	23

RESULTS AND DISCUSSION	24
A. Sociodemographic characteristics	24
B. The effects of Lebanon’s economic crisis on food consumption behaviors and food safety	29
C. The effects of the Covid-19 crisis on food consumption behaviors and food safety.....	39
Figure 13: Main snacks during the Covid-19 crisis	44
D. Correlations between different factors	44
E. Contributions and Limitations	46
CONCLUSION	48
APPENDIX I.....	50
APPENDIX II	51
APPENDIX III	52
REFERENCES.....	61

ILLUSTRATIONS

Figure

1. Household monthly income	26
2. Financial assistance during the economic and Covid-19 crises	26
3. Household income per month spent on food pre-economic crisis	30
4. Household income per month spent on food post-economic crisis	31
5. Consumption of local vs. imported products	32
6. Food brands pre and post the economic crisis	35
7. Change in the food storage means, compared to pre-economic crisis, because of the electricity cuts	36
8. Suspected sources of food-borne illness	37
9. Fresh products storage	41
10. Dry products storage	41
11. Behavior towards infested food products	43
12. Food poisoning cases during Covid-19	43
13. Main snacks during the Covid-19 crisis	44

TABLES

Table

1. Schools Targeted for Data Collection and Corresponding Populations	22
2. Respondent's education level	24
3. Assistance percentage of schools	28
4. effects of the Lebanese economic crisis on the purchasing power of the 3 schools	45
5. Food consumption frequency before the economic crisis	50
6. Food products that household stored in large quantities, during the Covid-19 crisis	51

CHAPTER I

INTRODUCTION

In this study, the word “crises” refers both to the Covid-19 crisis and the economic crisis that happened simultaneously in Lebanon. The Covid-19 crisis has caused a change in dietary patterns (Ismail et al., 2021). Additionally, Lebanon is experiencing an economic crisis marked by economic contraction, currency depreciation, and high rates of inflation as “prices of food and non-alcoholic beverages jumped by more than 483% between January 2021 and January 2022” (Lebanon Food Security Portal, Brief #24). The fact that most Lebanese citizens earn their salaries in the local currency, the Lebanese lira, has affected their purchasing power, including the capacity to purchase the same quality and quantity of foods as before.

These crises have been shown to have significant effects on food security outcomes (Ismail et al., 2021, WFP, 2020). Effects include: import disruption, market closures, food price inflation, changes in food storage preferences and headline food security status. For instance, Lebanon’s heavy reliance on food imports affected the availability of food during both crises. Imports make up “80 percent for major categories such as cereals and 100 percent for others such as refined sugar, rice, and vegetable oil” (Abou Zaki, 2020). The economic crisis has affected the purchasing power of the Lebanese retailers and wholesalers, who were unable to purchase imported products as before because of their high prices, meaning that products were not available in the Lebanese market for individuals to buy. Food prices in April were up 30% from the same month last year, according to

an index compiled by the United Nations' Food and Agriculture Organization (Lebanon Food Security Portal, Brief #26). Supply disruptions affected food prices, which in turn limited consumers' purchasing power – directly affecting the access pillar of food security. To add, Lebanon imports sunflower oil and wheat from Ukraine. The ongoing conflict in Ukraine affected the food availability in Lebanon as well, because food exports from Ukraine decreased (Trading Economics, 2022).

Covid-19 has disrupted food systems in many ways. Lockdowns imposed from early 2020 prevented people from going to work as well as from engaging in typical behaviors such as food shopping. Changes in food consumption behaviors linked to Covid-19 included panic buying, stockpiling, and shifting to less perishable food items (Manyanga et al., 2021). In Lebanon, efforts to stockpile food were complicated by the effects of the economic crisis including electricity cuts and fuel price increases, which posed challenges for the safe storage of perishable foods (McKelvey, 2021). Also, Covid-19 disrupted the production and export of major food products in different countries, temporarily limiting the import of those products to Lebanon. Over the longer term, Covid-19 has disrupted supply chains that have contributed to food price inflation (Su-Han et al., 2020).

As a result of these crises, Lebanon has been declared as a food insecure country, with food insecurity prevalence reaching up to “57% among middle-aged and older Lebanese adults (≥ 45 years) using the worst-case scenarios of a 70% reduction in income” (Kharroubi et al., 2021). This was based on the fast deterioration during the last few years across the four pillars of food security: availability, accessibility, utilization, and stability.

Access has been compromised in the Lebanese households because of both physical and economic constraints. The physical was because of Covid-19 and the different restrictions imposed by the government on the Lebanese citizens, restricting them to go out and shop at all time; the time frame in which people could go out to run errands was limited. Whereas the economic constraint is because of the economic crisis and fast increase of prices of goods and foods in Lebanon.

Utilization embeds the consumption of safe and nutritious food. Covid-19 triggered disruptions to food systems that have resulted in the consumption of unsafe or less nutritious foods. In fact, worldwide utilization has been compromised: “in some households, a glass of milk has become a luxury reserved only for children; fresh fruit, once deemed a necessity, is now a treat” (Durisin and de Sousa, 2021). In Lebanon, the challenges for safe and nutritious food consumption have been compounded by strong reductions in purchasing power as well as disruptions to food chains and storage for nutritious foods, which are often both relatively costly and perishable.

This study focuses on the access and utilization pillars of food security, specifically the changing food consumption behaviors in the access pillar and food safety in the utilization one. One specific aspect of concern is the impacts of these crises on food safety and the prevalence of food-borne illness. This is relevant because food insecure populations may be more prone to food-borne illness (Pavli et al., 2017). However, this is an understudied area in the academic literature to date.

Food safety is a complex notion that starts on the farm and ends on the fork. FAO defines food safety as being about “handling, storing and preparing food to

prevent infection and help to make sure that our food keeps enough nutrients for us to have a healthy diet” (FAO, n.d.).

Existing research on crises and food security do not focus on the food safety aspect. Now, the bigger proportion of the Lebanese population is food insecure, making them part of the vulnerable population when it comes to food safety: a population that is not getting enough nutrients will have weaker bodies, thus affecting their susceptibility to food-borne illnesses (Pavli et al., 2017). A smaller quantity of a foodborne pathogen can affect them, compared to a healthy population (Pavli et al., 2017). Usually, 1 out of 10 individuals worldwide gets food poisoned (WHO, 2020), however these numbers are much higher for individuals in unideal settings.

This study explores how these dietary changes have affected the food safety status of Lebanese households across different socioeconomic classes. As already mentioned, Lebanese people are changing their dietary habits because of many reasons, and those changes are resulting them to incorporate foods in their diet that were otherwise not consumed, or getting cheaper alternatives that are sometimes not as safe as what they used to eat. It aims at identifying the major food consumption behavior changes caused by the economic and Covid-19 crises in Lebanon that are causing or preventing food-borne illnesses. It identifies the emerging food safety inconsistencies and increases in food-borne illness outbreaks because of changes related to food consumption.

Few studies have emerged in the literature to study the effects of economic and Covid-19 crises on food consumption behaviors and food-borne illness; however, these are generally conducted in other contexts. A small number of studies do focus

on the effects of two coexisting crises on food behaviors and food safety in Lebanon. One study from Lebanon addresses food safety in the crisis context, but is more limited in scope to address only food deliveries (Faour-Klingbeil et al., 2021). Another study by the World Food Programme (WFP) in Lebanon narrowly focuses on the behaviors of the citizens concerning food storage, but not wider food behavior changes linked to food safety (WFP, 2020).

(Hypothesis): Both crises have changed food consumption behaviors (Lebanon is a food insecure country) and changes in food consumption behaviors are contributing to a reduction in food safety at the household level

A. Research Objectives

- a) RQ1: To identify how the Covid-19 crisis and economic crisis have affected food consumption behaviors among Lebanese households
- b) RQ3: To assess how changes in food consumption behaviors caused by the Covid-19 and the economic crisis, are affecting food safety at the household level

CHAPTER II

LITERATURE REVIEW

A. Food Security Definition and Pillars

Food security is commonly defined to exist when “all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their food preferences and dietary needs for an active and healthy life” (World Food Summit, 1996). The four pillars of Food Security are: availability, access, utilization and stability. First, availability is when sufficient quantities of food of appropriate quality are available, either by domestic production or imports. Second, access is both physical and economic. For example, the physical access is when people are able to commute to get their food or they have it delivered to their place of residence. A lot of things play a role on this factor, ranging from political conflicts, social arrangements and economic instability. The economic access is when a population is not able to get food, specifically nutritious food, because of not having the purchasing power to buy the food products. Sudden shocks can be the reason to a compromised availability. Third, utilization is when all physiological needs are met, that being adequate diet, clean water, sanitation and health care. In other words, the consumption of safe and nutritious food. Finally, stability is when all of the above-mentioned pillars are present over a continuous period of time.

B. The effects of the Covid-19 crisis on food behaviors

The Covid-19 virus is a zoonotic disease that affects a human’s respiratory system (WHO, 2020). By definition, a zoonotic disease can be transmitted directly or indirectly

between humans and animals, by contact, or through the consumption of contaminated foods (EFSA, n.d.). Despite the recent emergence of Covid-19, research has explored its global impacts on many aspects of people's lives, including through the food system.

Emerging research has shown that the food industry has been largely affected by consumers' changes in food behaviors, including food purchasing and storage, in response to Covid-19. For example, in Zimbabwe, a decrease in dining out was noticed among the population; instead, citizens resorted to panic buying at the grocery stores, creating a shortage in food stocks along with an increase in household food waste due to overbuying (Manyanga et al., 2021). Elsewhere, research has found that people feared going to the supermarkets, thinking that food packaging may increase the transmission of the Covid-19 virus (Faour-Klingbeil et al., 2021). Online food markets have grown as an alternative to in-person food shopping, as they allowed consumers to safely purchase their grocery items while decreasing the spread of the Covid-19 virus (Su-Han et al., 2020).

Changes in eating habits were also noticed among the population's food behaviors during the Covid-19 pandemic. In Lebanon, Jordan, and Tunisia, citizens relied on home-based food consumption while avoiding ready-to-eat food orders (Faour-Klingbeil et al., 2021). However, many studies showed that the quality of the home-based consumed foods was not nutritious. A cross-sectional study conducted in Lebanon, looking at the dietary changes and lifestyle changes during Covid-19 in Lebanon, showed that its population relied more on consuming canned and ultra-processed goods that are rich in sodium, fats, and sugar while decreasing their daily intake of fresh fruits and vegetables (Ismail et al., 2021). Moreover, 32.8% of the Lebanese population claimed an increase in their weight because of the increase in the

consumption of homemade meals, excessive snacking, lack of physical activity, and sleeping disturbances (Ammar et al., 2020; Ismail et al., 2021). The changes in eating and activity habits have raised national and multinational concerns of malnutrition, calling for immediate intervention (Ismail et al., 2021).

C. The effects of the Covid-19 crisis on food safety

Different measures were taken to mitigate the spread of the Covid-19 virus.

Governments have imposed strict lockdowns, social distancing, hygienic practices, and travel bans. Food safety has been extensively raised among the world's population to mitigate the spread of the COVID-19 virus (Murendo et al., 2021).

With the rise of Covid-19 cases, people performed different activities to protect themselves from infection. For instance, a study conducted in Lebanon, Jordan, and Tunisia reported an increase in the use of sanitary and hygienic materials before food handling and consumption in order to reduce the transmission of the COVID-19 virus through handling food packages and dining out (Faour-Klingbeil et al., 2021). Many relied on cleaning agents to wash fresh produce, though not everyone has read labels for the proper use of the disinfectant agents. This gap in knowledge prompted calls for public awareness regarding their use since these agents contain chemical compounds that may be hazardous when ingested (Ismail et al., 2021).

Concerns regarding the transmission of the COVID-19 virus through food, has led to an increase in the population's food safety knowledge and practices (Min et al., 2020), though gaps persist. For example, a cross-sectional study among university students in Jordan explored different aspects of food safety knowledge and practices, of which the transmission of the COVID-19 virus through food. Around 62.4% of the

students believed that the COVID-19 virus could not grow on food, yet only 27% of the participants believed that the virus was not transmissible through food (Osaili et al., 2021). Although the latter statement is correct, the low percentage of knowledgeable participants showed that more education is needed among the population to acquire it. As for the other aspects of food safety like food handling and cooking, university students in Jordan and Canada showed good knowledge and hygienic practices, especially among those who cook (Courtney et al., 2016; Osaili et al., 2021).

D. The effects of economic crisis on food behaviors

Economic context affects food security and safety. For instance, food security is ensured with food availability and accessibility across the population, while food safety is ensured with the implementation of proper hygienic and sanitary measures.

Economic crises may affect many countries while negatively impacting their financial and non-financial sectors (Madani, 2009). For instance, unemployment rates may increase across the population (Junankar, 2011), which may impact families' food consumption behaviors due to the lack of income of the previously employed family members (Bentolila et al., 2008). Studies across Italy, Spain, Great Britain, and the U.S. showed that the latter statement is particularly true when the male household head is the unemployed one (Bentolila et al., 2008). The reduction in income and in purchasing power has a direct effect on the food behaviors of people. In Argentina, the 2002 economic crisis led to a reduction in the amount of food consumed among a large percentage of households that relied on cheaper goods and home-based food productions (McKenzie, 2005). Food consumption decreased by 75% across the population in Argentina, with 92% of the households replacing their food items with

cheaper products (McKenzie, 2005). Another example is during Spain's 2014 crisis, consumers changed their food purchasing behaviors to prioritize price, whereas other factors including external appearance, origin, quality labels, and packaging were more important previously (Rabadán et al., 2020). Thus, consumers are more likely to shop rationally during an economic crisis, avoiding non-essential products while relying more on food offers found at the stores (Basev, 2014).

Another similar case is Venezuela, where food security and accessibility to basic life needs like water, gas, and electricity were affected, because of the economic crisis in the country, compromising the individuals' cooking activities (Mejias-Carpio et al., 2021). Further, the unavailability of food has led to malnutrition across the population (Mejias-Carpio et al., 2021). Also, the economic crisis has caused impoverishment in the levels of education, employment rates, and quality of life (Mejias-Carpio et al., 2021). Other studies from Vietnam showed that in general settings, its citizens of low socio-economic status relied heavily on neighborhood small vendors to purchase their food as a way of saving additional transportation costs and higher prices at the supermarkets (Figuié et al., 2009), which suggests that small vendors may not have the same variety of food and non-food products as bigger markets.

E. The effects of economic crisis on food safety

Literature is scarce on the effects of economic crisis on food safety. It is suggested that during an economic crisis, people get cheaper alternatives of the same food products (Basev, 2014). While most consumers see food quality and food safety as interlinked concepts (Rijswijk et al., 2008), there is limited evidence in the literature to confirm whether or not quality perceptions in fact reflect variation in food safety.

During an economic crisis, individuals are more prone to get infectious diseases due to stress and lack of food safety (Pavli et al., 2017). A study from Venezuela has shown that food safety has been compromised during the economic crisis due to the lack of governmental actions in pursuing epidemiological surveillance. Detection and reporting of infectious diseases that may have been caused by a lack of food safety were hindered (Mejias-Carpio et al., 2021). Further studies showed a higher prevalence of intestinal parasitosis across the Venezuelan population (Mejias-Carpio et al., 2021). Those parasites are transmitted through food or water (Mejias-Carpio et al., 2021). This shows the importance of food safety on the consumers' food behaviors and overall health (Liguori et al., 2022).

CHAPTER III

MATERIALS AND METHODS

This research builds on a primary data set. No data has been already gathered on the research topic in the area of focus - Lebanon, specifically metropolitan Beirut. Therefore, a primary data collection was needed in order to first identify the changing food behaviors caused by both the Covid-19 and the economic crises in Lebanon; and then accordingly to identify and assess their effects on the food safety status of the families.

Primary data collection obtained qualitative and quantitative data with the cooperation with three schools, each from a different socioeconomic background. The majority of the data was quantitative, except from three questions which were qualitative. This was appropriate because, we wanted to compare different effects of both crises with the socioeconomic status of the responding households. . . .

The data collection targeted a survey population consisting of households with school-aged children. This was the case, since those parents are middle-aged individuals, who need to provide for a family, during a crisis. This research wanted to see the effects of the crises on families and society.

The survey population was targeted to include households from different socioeconomic backgrounds. This approach was taken for several reasons: first, the research team found the comparison between the effects of the crises on eating behaviors and food safety to be very interesting and rare in the literature. A research of its kind is particularly missing in the Lebanese setting, with Lebanon's unique situation (dual crises happening simultaneously). Also, the socioeconomic background is

believed to play a role in how much the population feels the effects and is affected by these crises. This research wants to see the gap between different socioeconomic backgrounds and the effects of the crises on their households and whether or not that gap is significant.

A. Survey Instrument

A structured web-based survey instrument was developed in which respondents were asked to answer questions related to their experiences concerning food purchasing, storage and food safety during the Covid-19 and the economic crises. The instrument consisted of 36 questions and comprised four modules (Appendix 3):

- Module 1: Socio-demographic characteristics (9 questions)
- Module 2: The effects of the economic crisis on food consumption behaviors (10 questions)
- Module 3: The effects of the economic crisis on food safety (5 questions)
- Module 4: The effects of the Covid-19 crisis on food consumption behaviors and food safety (12 questions)

While the economic and Covid-19 crises and their impacts on household food behaviors may be interlinked, the survey nevertheless asked respondents about these crises separately in order to distinguish their effects as clearly as possible. This interlinkage was taken into consideration while analyzing the results.

The survey was also reviewed for content validity and clarity by a food safety expert and a food security expert in the research team. The questionnaire was revised based on their recommendations. The questionnaire was initially designed in English. To ensure the quality of the translation, native speakers performed a back-translation

orally to the research team. After translation, the survey was made available in three different languages, according to the preference of the respondent: English, Arabic and Armenian.

The survey instrument and the procedure to be followed were approved by the Ethical Approval Committee of the Institutional Review Board of the American University of Beirut (AUB) in Lebanon. As part of the ethical approval requirements, the survey form was set to allow respondents to continue the survey even when they choose not to answer any of the questions. This explains the few missing answers to some of the questions.

B. Survey Procedure

1. Pre-test stage: piloting

A pilot of the survey instrument reached 21 respondents, to assess the readability of the survey instrument, examine content reliability, and ensure it provided the desired information. The pilot also allowed the research team to confirm the translation clarity of the scientific terminology and evaluate the length of the survey. The recruitment of the respondents for the pre-testing stage was done with the snowball sampling technique. It mostly included university students (different than the target population for this research), as they were the most feasible to reach. However, the backgrounds of the students were diverse.

All suggested changes were considered.

2. Survey administration and participants' recruitment

The studied population consisted of parents of children attending schools, both primary and secondary, near Beirut, Lebanon. Feasibility led the research team to work with three Armenian schools - schools that largely target the Armenian-Lebanese community, offering education in languages including Armenian. Before finalizing the research methodology, the research team had taken a preliminary approval from the schools' administrations to cooperate with this research effort. The research team informed the schools that there was no direct benefit to them from this research.

The selection of eligible schools was purposive, to reach households from different socioeconomic backgrounds. The socioeconomic background of the three schools was determined using a proxy measure, based on the schools' respective tuition fees (Table 1). The tuition fees were obtained from the schools administrations. Schools were then classified as high, medium, or low economic status.

The total population of parents from the selected schools was 762. To ensure statistically representative results (confidence level = 95%, margin of error 5%), the research team aimed to collect 262 answers in total (**Error! Reference source not found.**)¹. Ultimately, 267 responses were collected.

¹ Total number of parents (taking into consideration both parents in the same household as one entity) = 762
Confidence Level: 95%
Margin of error: 5%
Sample size: 262

Table 1: Schools Targeted for Data Collection and Corresponding Populations

School	Socioeconomic Status				Population			
	High	Middle	Low	Tuition fees	Total	Surveys Targeted	Surveys Collected	Percent surveys collected
School A	X				290	100	103	38%
School B		X			190	65	53	20%
School C			X		282	97	111	42%
TOTAL	-			-	762	262	267	100%

The data collection was conducted via online surveys. An invitation to participate and the link to the online survey were sent to the parents via email or Whatsapp message by the school administrations. Surveys were administered via the LimeSurvey platform available supported by the American University of Beirut; this platform does not collect any information other than what the respondents provide (i.e., IP addresses are not recorded). From each household, only one parent - preferably the one who primarily prepares food at home - was required to answer the survey on behalf of the household. The survey was anonymous. The research team did not have any direct interaction with the participants.

Upon accessing the online survey, respondents were invited to choose the preferred language to complete the survey (English, Arabic, or Armenian); read a short statement on the purpose of the research and learn about their rights (including anonymity of responses); then were asked to give consent and continue to the survey questionnaire. Respondents were informed that they were free to terminate the survey at any time if they felt that they were no longer comfortable providing responses.

Anonymity and confidentiality of the data were ensured throughout the data collection, analysis, writing and archiving.

The survey required approximately 15 minutes of respondents' time, including the consenting process. The short survey duration ensured that the individuals filling it completed it without abandoning the survey before submitting. A brief survey also decreased the risk of respondents not answering truthfully because of inattention.

Data was collected between March and April, 2022.

3. Statistical analysis

The quantitative data were analyzed using the SPSS software program (IBM SPSS Statistics, Version 24.0). Descriptive statistics such as frequencies and proportions (percentages) were produced to summarize data. Statistical tests were also conducted: Chi-square tests was used to chart comparison between two categorical variables, provided that sample size was large enough. Otherwise, Fisher's test was used. One-Way ANOVA test was used to compare the mean of assistance scores between the three different schools. P-values of <0.05 are considered statistically significant.

The qualitative data was not analyzed (3 questions).

CHAPTER IV

RESULTS AND DISCUSSION

A. Sociodemographic characteristics

To better understand the role of some sociodemographic and socioeconomic factors on food behavior changes and the food safety status of the respondents, the sociodemographic characteristics of the respondents were collected through the first module of the online survey.

The studied population were the parents of school children from three different schools in Lebanon, each from a different socioeconomic background (Table 1). From the households (parents) who responded, the biggest proportion (49.6%) had one person employed at the time of data collection. Concerning the highest education level the respondent has received, the highest number of respondents had an undergraduate degree (26.3%), followed by a high school diploma (22.3%) and third came a 9th grade Brevet (10%) (Table 2).

Table 2: Respondent's education level

Respondent's education level	Frequency	Percent
9th grade in school, Brevet	45	17.9%
Technical degree (BT...)	19	7.6%
Baccalaureate	56	22.3%
Undergraduate level (BS, BA, BE...)	66	26.3%
Master's degree	25	10.0%
Doctoral degree	2	0.8%
Other	38	15.1%

Results in Figure 1 show the different income levels of the respondents: 32.8% of respondents reported a household income between 1,000,000 L.L and 3,000,000

L.L.². As expected, the household monthly income of the parents from higher socioeconomic background were higher than those from a lower socioeconomic status, meaning that the households who sent their children to School A had a higher income per month than those who sent their children to School B and the School C households had the lowest income per month from the three schools. The difference between the three schools household monthly income was statistically significant (p-value=0.00<0.05), meaning there is a correlation between the schools and the household monthly income. This shows that indeed the three different schools represented different socioeconomic backgrounds. Figure 2 shows the share of respondents who had received any type of financial assistance during the economic and Covid-19 crises. Here, it was interesting to see the split between the different socioeconomic backgrounds.

² During the economic crisis in Lebanon, the exchange rate from Lebanese Lira to US Dollars is fluctuating constantly. For instance, on the date of May 10, 2022, 1 US \$= 27,000L.L. In other words, each 1,000,000L.L. is equal to 37 US \$.

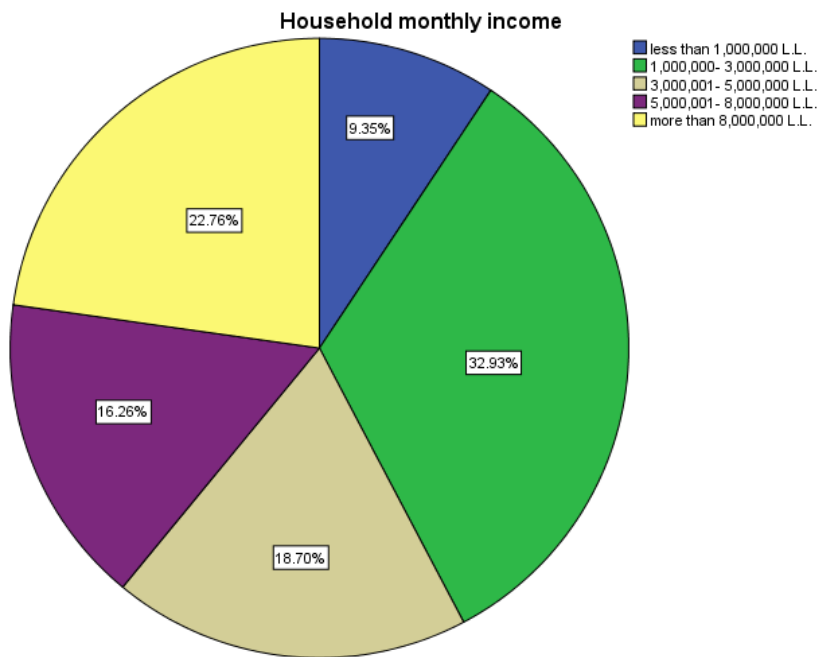


Figure 1: Household monthly income

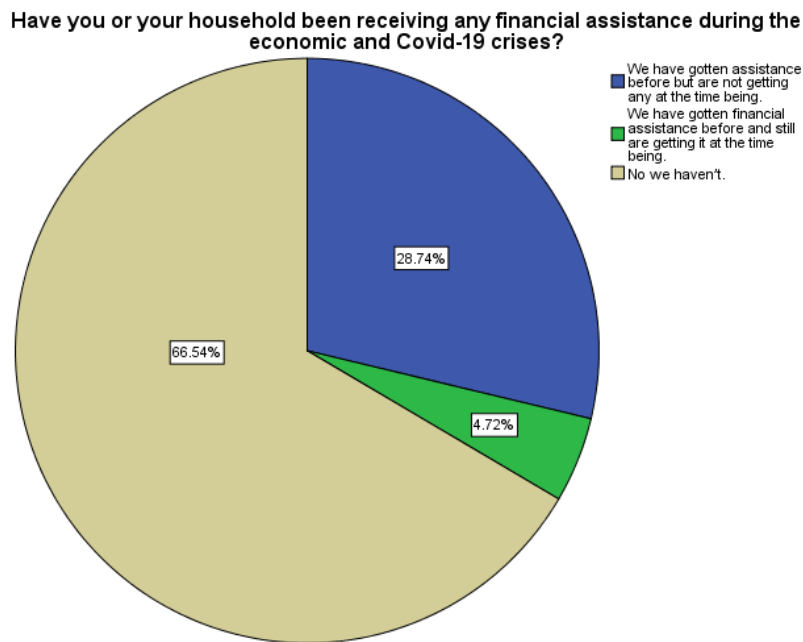


Figure 2: Financial assistance during the economic and Covid-19 crises

Among those respondents who received or had received financial assistance during the COVID-19 or economic crises, the types of assistance received were as follows: food boxes (26.0%), cash money in Lebanese Lira (14.7%), food stamps (5.0%), and cash money in U.S. dollars (1.2%). It is worth noting that the respondents could have answered more than one option for this question, and that means some households could have gotten assistance in more than one way, thus the percentages do not add up to 100%. Also, 59.7% of the respondents have said that they haven't gotten any type of assistance. Cross-tabulation (Chi-square) tests were performed to see the correlation between different types of financial assistance. There was a significance between those who answered that they have gotten cash money in Lebanese Lira and food boxes ($p\text{-value} = 0.000 < 0.05$). This means that, statistically, from those assisted, there was a good proportion of households that were getting these two types of assistance (cash money in Lebanese Lira and food boxes) simultaneously. All the other combinations were not significant with each other ($p\text{-value} > 0.05$), meaning, from those assisted, not a lot of households were getting the remaining types of assistance simultaneously. As for the distribution of the percentages of the households that were assisted, the highest percent was school C, second came school A then school B (Table 3).

Table 3: Assistance percentage of schools

Financial assistance during the economic and Covid-19 crises				
Children's school	We have gotten assistance before but are not getting any at the time being.	We have gotten financial assistance before and still are getting it at the time being.	No we haven't.	Total
School A	16.4%	58.3%	47.9%	39.3%
School B	11.0%	8.3%	23.4%	19.0%
School C	72.6%	33.3%	28.7%	41.7%
Total	100.0%	100.0%	100.0%	100.0%

Also, it was interesting to compare the mean of assistance scores between the three different schools (Table 3), to see if there is a significance between the three schools and whether or not they have gotten any type of financial assistance. For this, One-Way ANOVA test was performed and the results showed that there is a significance between all the schools and whether or not they have gotten assistance (**Error! Reference source not found.**). This means that the factor of receiving financial assistance was affected by the socioeconomic status of the respondents.

Table 4: One way ANOVA comparing the means of assistance scores between the three different schools

Multiple Comparisons

Dependent Variable: assisted students from schools
Bonferroni

(I) Children's school	(J) Children's school	Mean Difference (I-J)	Std. Error	Sig.	95% CI Lower Bound	Upper Bound
School A	School B	-.900*	.086	.000	-1.11	-.69
	School C	-1.900*	.056	.000	-2.04	-1.76
School B	School A	.900*	.086	.000	.69	1.11
	School C	-1.000*	.077	.000	-1.19	-.81
School C	School A	1.900*	.056	.000	1.76	2.04
	School B	1.000*	.077	.000	.81	1.19

*. The mean difference is significant at the 0.05 level.

Finally, in more than 80% of the households, the primary person responsible for cooking or preparing the food was the mother. In some cases (12%), the grandparents cooked. These numbers were almost coherent between the three socioeconomic statuses (schools), with slightly higher percentages (86-87%) from mothers of schools B and C (middle and low socioeconomic status) cooking at home, compared to a lower percentage (79%) from school A mothers regularly cooking for their households. This data was important for later tests on the food safety aspect of the households in the research.

B. The effects of Lebanon's economic crisis on food consumption behaviors and food safety

The economic crisis has caused a decrease in purchasing power for 70.20% of the participants. Even for the schools with higher socioeconomic status, the majority of the respondents within the school (54.9%) said that the purchasing power of their household decreased. Reflecting this decrease in purchasing power, a big proportion (30%) of the survey respondents spend more than 70% of their household monthly income on food, compared to before the economic crisis, where they only spent between 30% and 39% of their monthly income on food (Figure 3 and Figure 4). This result cannot be compared to findings from other studies, since no such data has been already published about Lebanon, after the dual crises. However, in the US, in 2020, "U.S. consumers spent an average of 8.6 percent of their disposable personal income on food" (USDA, 2022) which was significantly lower than what the Lebanese consumers usually spent before crisis. 30%-39% of their monthly income. Also, globally, the prices of foods have been increasing, for example in China there was a nominal increase of

“6.3 percent over the previous year” on the price of goods and foods (NBSC, 2022).

Yet, even with the increase in food prices, the monthly expenditure on food is far lower than 70% of the monthly income, which is the case in Lebanon.

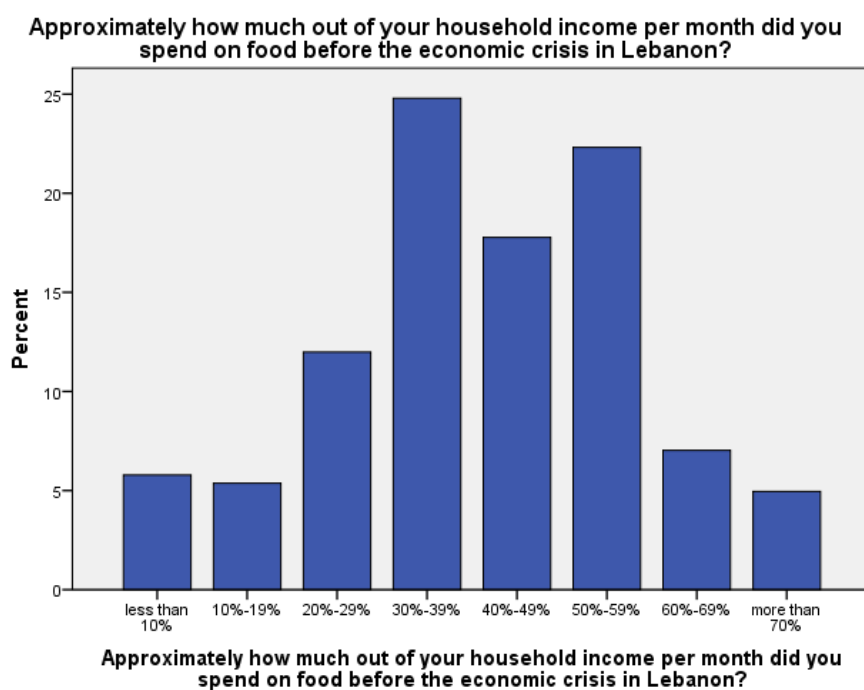


Figure 3: Household income per month spent on food pre-economic crisis

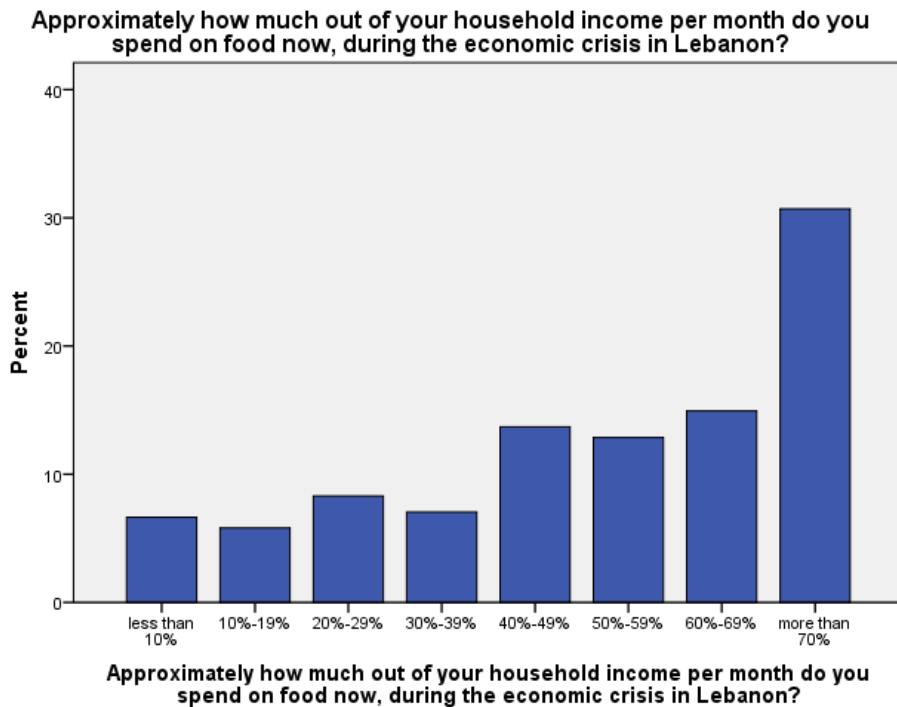


Figure 4: Household income per month spent on food post-economic crisis

As the socioeconomic background got higher, the number of households who spent less on food got higher. In other words, as families had a higher income per month, they spent less on food. This finding restates Engel's law³. However, it is important to underline that the majority of all the socioeconomic backgrounds (the three schools) spent a higher proportion of their incomes/month on food, because of the economic crisis. That said, there is a statistical difference between the three different schools and the monthly expenditures on food.

Figure 5 shows that a majority of households are consuming more local food products, compared to the pre-crisis period. This can be explained by the fact that

³ Engel's Law is a 19th century observation that as household income increases, the percentage of that income spent on food declines on a relative basis (Hayes, 2022).

potentially imported foods are usually more expensive in an economic crisis setting. Also, another explanation might be that imported food products might not always be available in fluctuating economies. Here, global economies and conflicts play a role as well. For example, the unstable political situation in Ukraine has affected the imports to Lebanon (Trading Economics, 2022), thus affecting the availability of imported foods.

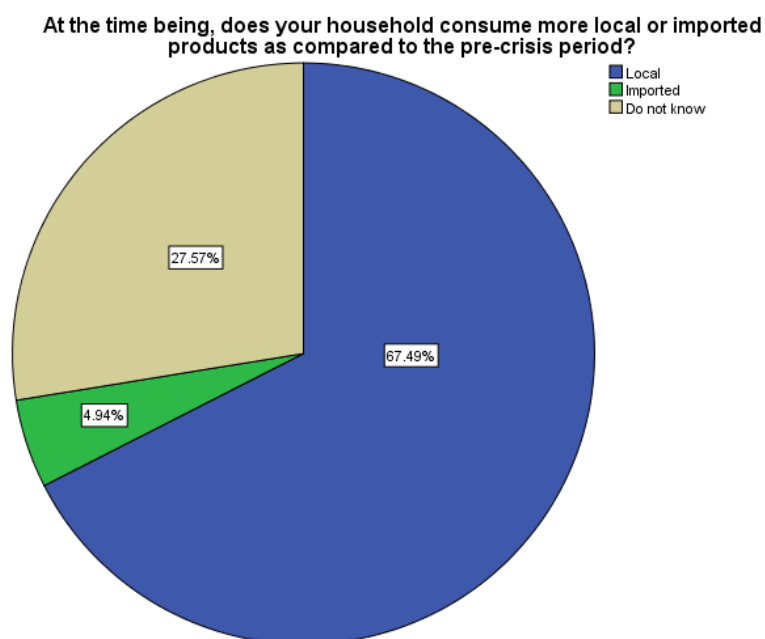


Figure 5: Consumption of local vs. imported products

Furthermore, the consumption behaviors of certain food products both pre- and post-economic crisis has been studied. Households reported a significant change in the frequency of consumption of items including red meat, poultry, fish, bread, pasta, rice, milk, dairy products, deli products, canned products, fruits, vegetables, raw nuts, salty snacks, and sweet snacks (all p-values < 0.05). This means that there is a correlation between the quantities consumed of these products pre and post economic crisis. In other words, the economic crisis has affected the frequency in which households consume these food products. The only product for which no correlation was reported

between the levels of consumption between pre- and post-economic crisis, was the amount of pulses consumed. This could be because a lot of Lebanese dishes contain grains and this food product is considered a staple in the country.

However, other than grains and pasta, the consumption of the other studied food products decreased. This could be for many reasons, but since the main shift in the lives of the respondents was the economic crisis, it is believed that the prices of these goods could have played a major role in the frequency of their consumption.

Another interesting point is that as seen in Appendix 1, most food products are being consumed less during the economic crisis. Since, almost all of the products have a decrease in consumption pattern, this could mean that people have been skipping meals. In fact, a study by the World Food Program has shown that a way of food based coping that Lebanese citizens were using was skipping meals: “19 percent skipped meals or did not eat for a whole day and night” (WFP, 2020).

The study population has also changed the frequency of eating selected foods after the economic crisis (**Error! Reference source not found.**). When asked about the reason for the shift in eating behavior, the most common response was that the food products the respondents used to eat before the economic crisis, got very expensive after the economic crisis. The second most popular reason given was that they believed that the quality of the foods are not as good as before, while others indicated that they were worried about food safety which affected their food choices. Finally, a small proportion of the population reported that they cannot find their preferred foods in the shops. It is interesting to note that, while 79.9% of the respondents have perceived a change in the quality of foods their household have been eating lately (comparing it to pre-economic crisis period), not all of them have considered it the main reason to changing what they

eat. Finally, there was a significance between the three different schools and their perception of change in food quality ($p\text{-value}=0.00<0.05$). This means that there is a correlation between these two factors: people perceived the change in the quality of foods they eat differently, when from different socioeconomic backgrounds.

In parallel, when talking about quality, the brands of the foods are important to look at. In this case, almost all the households had switched all or a part of the brands of food they use (Figure 6). As expected, the School C families were the ones that changed the brands of food products they used the most, then came the families of School B, and the least brand changing households were from School A. It is important to note that there was a significance between these two compared factors: schools and brands of foods, meaning one affects the other and there is a correlation between them. Nowadays “the brand becomes one of the basic motives for the consumers’ choice of a particular food product” (Vranešević et al., 2003). However, in this study, other factors have played a role in the choice as well. Respondents reported that the main reason for the brand switch was that the better quality food products got very expensive, or their preferred brands are no longer available in the markets. A few people indicated that the quality of the same food brands are not as good as before, and this is why they have shifted to other brands.

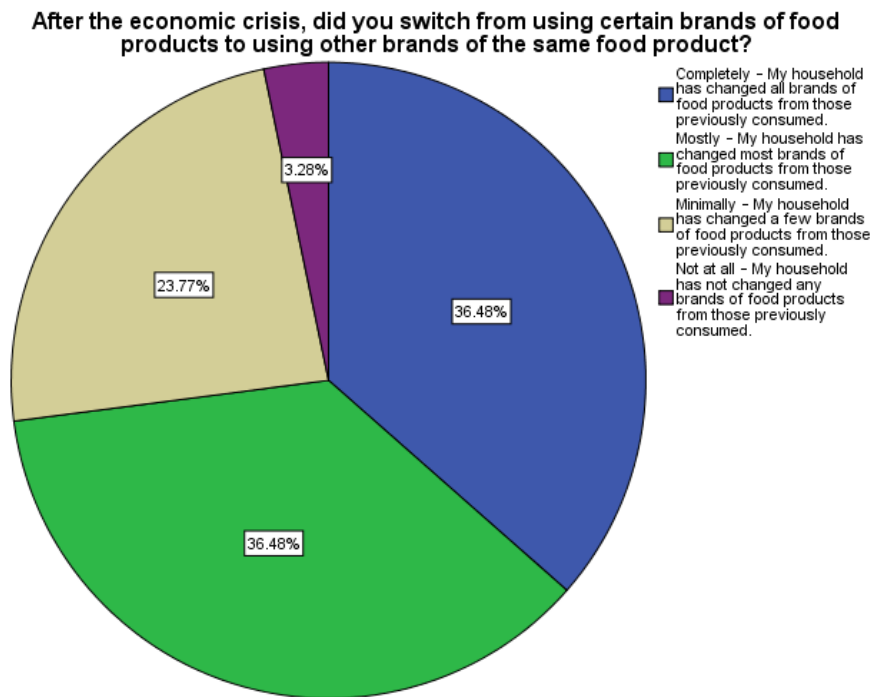


Figure 6: Food brands pre and post the economic crisis

Finally, during the economic crisis, people started eating more home cooked foods. This was the same as the case in Argentina, where people focused on cheaper home cooked foods during an economic crisis (McKenzie, 2005).

The economic crisis in Lebanon has affected food safety in many ways. For instance, because of the frequent electricity cuts in Lebanon, 66% of the respondents said that they changed their food storage means compared to pre-economic crisis. As shown in **Error! Reference source not found.** 61.7% of the respondents did not buy food in large quantities to avoid the problem of storage with electricity cuts. Whereas, 13.7% stored their food products in the fridge but checked the temperature frequently, 10.9% stored their food products in the fridge without finding necessary to check the temperature frequently and 13.7% thought the storing food in the freezer was the safest choice.

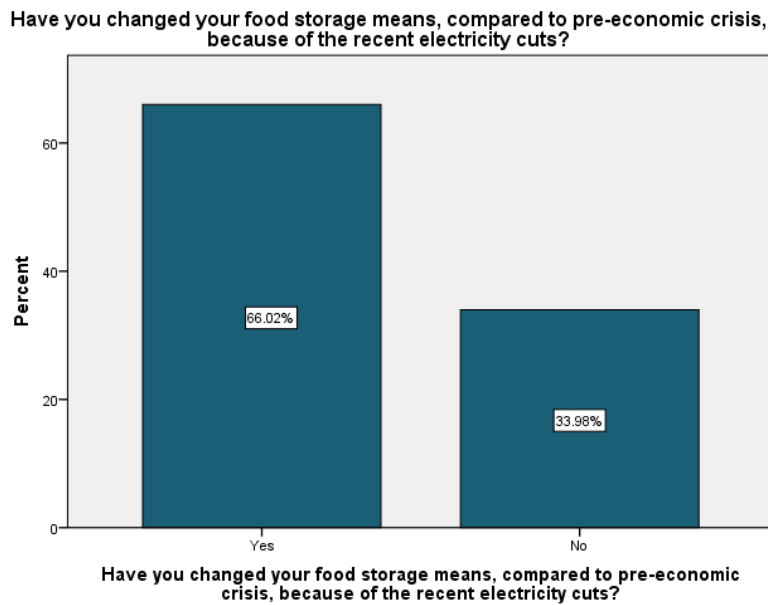


Figure 7: Change in the food storage means, compared to pre-economic crisis, because of the electricity cuts

As already stated, two-thirds of the participants changed their food storage means. This number was different between the three schools and that difference was statistically significant. This finding means that the change in food storage behaviors was affected by the socioeconomic status of the families. Other than that, only 15.6% of the respondents had anyone from their household who suffered from food poisoning in the past 12 months; a further 12.9% of those who responded were not sure. There can be various sources for those food poisoning cases: **Error! Reference source not found.** shows people's suspected source of illness, whether it's home cooked food, eat in restaurant food or take away/delivery food. It shows how the majority of the respondents did not know from where they got food poisoning. After that, the respondents said that they got food poisoning because of take-away/delivery food. That

said, this result was expected, as from general observation, we can see that people suspect restaurant or take away foods to be less safe than home-cooked ones.

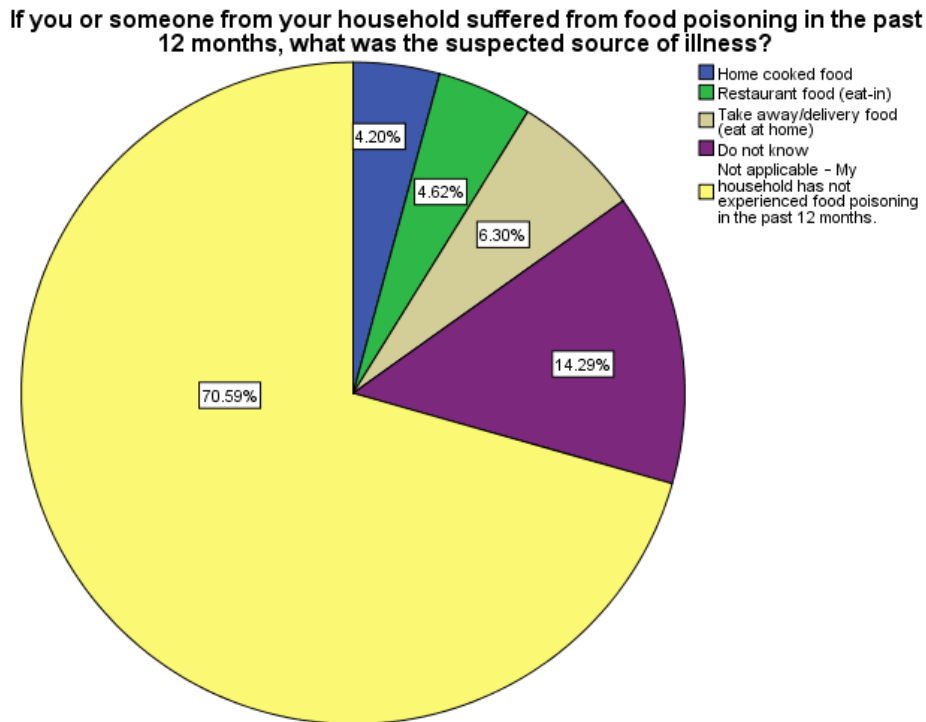


Figure 8: Suspected sources of food-borne illness

Finally, more than half of the survey participants (58.4%) believed that the food poisoning incidents in Lebanon have increased during the last 12 months⁴. It is worth noting that this number is not proportional to and far exceeds the number of people who reported food poisoning within their household over the same period; this discrepancy can be normal as the households can be careful noticing the increase of food safety outbreak reports in the media or it can hypothetically mean that the respondents do not know how to identify food poisoning. A Chi-square test confirms the significance (p-

⁴ taking into consideration that the respondents filled the survey during March, April 2022- the last 12 months will make the period between March-April 2021 and March-April 2022

value=0.01<0.05) between self-reported food poisoning cases in the household and a belief about the food poisoning incidents in Lebanon. This means, respondents reporting food poisoning within their households are more likely to report an increase in food poisoning incidents in Lebanon over the past 12 months. These findings are generally but not fully consistent with previous research. For instance, “cases of food poisoning have been on the rise” (Naddaf, 2021), yet “in 2019, 510 cases [of food poisoning] were reported. Despite all the anecdotal evidence of a sharp rise in cases, only 210 have been reported so far in 2021” (Naddaf, 2021).

Also, our study shows that people believe that the food poisoning incidents in Lebanon have increased during the economic crisis, which is consistent with the literature that finds during an economic crisis, epidemiologically people get more food poisoned because of the stress of the situation making their immunities lower (Pavli et al., 2017). Even though the households have perceived an increase in food safety outbreaks, agreeing with the previous statement, our study found that the number of people who actually self-reported as gotten food poisoned was low.

The three different schools did not affect the self-reported food poisoning cases in the households. In other words, the different socioeconomic background households reported food poisoning in the same way, without getting affected by their status. The same case was with the belief of food poisoning cases in Lebanon, which was not correlated with the three different schools. The respondents believed the food poisoning incidents in Lebanon have increased, decreased or stayed the same, regardless of their socioeconomic backgrounds.

C. The effects of the Covid-19 crisis on food consumption behaviors and food safety

During the Covid-19 pandemic, Lebanon's government closed schools and places of employment (with exceptions) and imposed lockdowns on citizens. Consistent with these restrictions, a full 98.1% of the study population reported that they shifted food consumption behaviors to eat more home cooked foods rather than ready to eat foods. This result was consistent in the three schools. This finding is similar to the case of India, where people started to cook more because of the Covid-19 situation, whether because they did not have access to food deliveries or because they had time during lockdowns (Lakshmi et. al, 2020).

Furthermore, 83% of the respondents started to store large quantities of foods. This number was not significantly correlated with the schools, which means that no matter the socioeconomic background, approximately the same percentage of parents stored large quantities of foods during the Covid-19 pandemic. Reasons given for this food storage were to make sure that the household does not run out of food, but also to save some money, as the Covid-19 crisis coexisted with the economic one. Fewer people mentioned that they stored food because their households were consuming more and some wanted to always have pass-time foods, meaning they wanted to have access to different snacks in their households to eat when bored. An empirical study about the intention to hoard food during the Covid-19 pandemic found that the pandemic "will cause the intention to buy goods that no longer follows the common sense" (Long et al., 2020). In order to see if that is the case in the study population, **Error! Reference source not found.** reports those foods respondents stored in large quantities. It is important to note that other respondents have mentioned that they restrained from

storing food products, finding unnecessary to panic or not having enough storage/freezer space.

When storing food, there are two types of products: fresh and dry. Those who stored big quantities of fresh foods (meat, poultry, eggs, dairy products, etc.) bought in quantities that fit their freezer. Only 4.4% of the respondent bought new freezers for storage purposes during Covid-19 (Figure 8). As seen in **Error! Reference source not found.**, more than 50% of respondents bought large quantities of dry products like rice, pulses and pasta. They mainly stored these in the cupboard like they used to do before the crisis, since not all of them were primarily worried about their safety (Figure 10). That said, only 24.71% of the ones storing dry foods had pest infestation on their grains during the Covid-19 pandemic. The behavior of the respondents towards these infested products is reported in Figure 11. It is commonly believed that, storing large quantities of foods may lead to food safety problems. During the Covid-19 crisis and lockdowns, the study population noticed either an increase or consistency in food poisoning cases, both in their households and in their entourage (Figure 12). In order to see if the perception of food safety was significantly different between the schools, a Chi-square test was performed and the obtained p-value showed that there is no correlation between the different schools (i.e. different socioeconomic backgrounds) and the perception of food poisoning cases in the households.

How did you store the large quantities of fresh products (meat, poultry, eggs, dairy products...)?

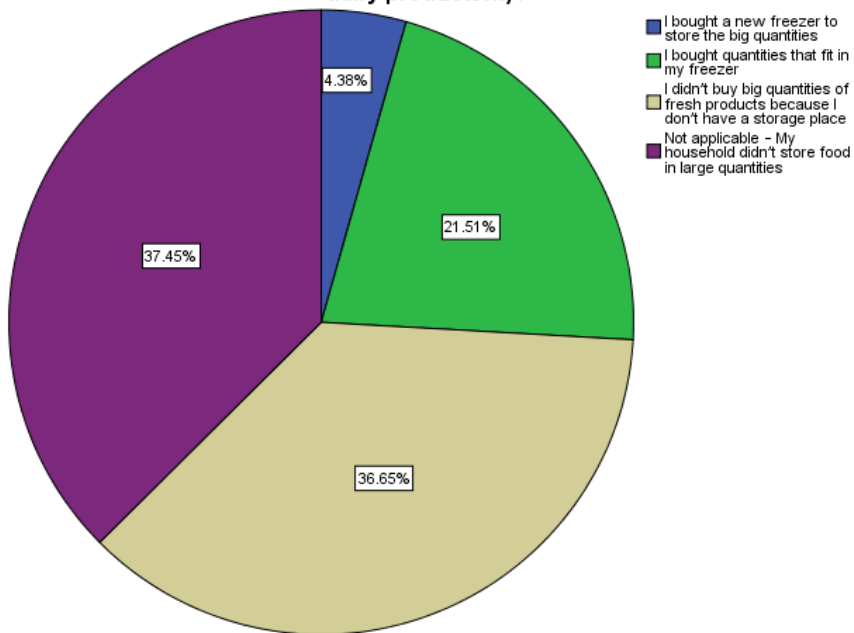


Figure 9: Fresh products storage

How did you store the large quantities of dry products (lentils, rice, pasta, flour...)?

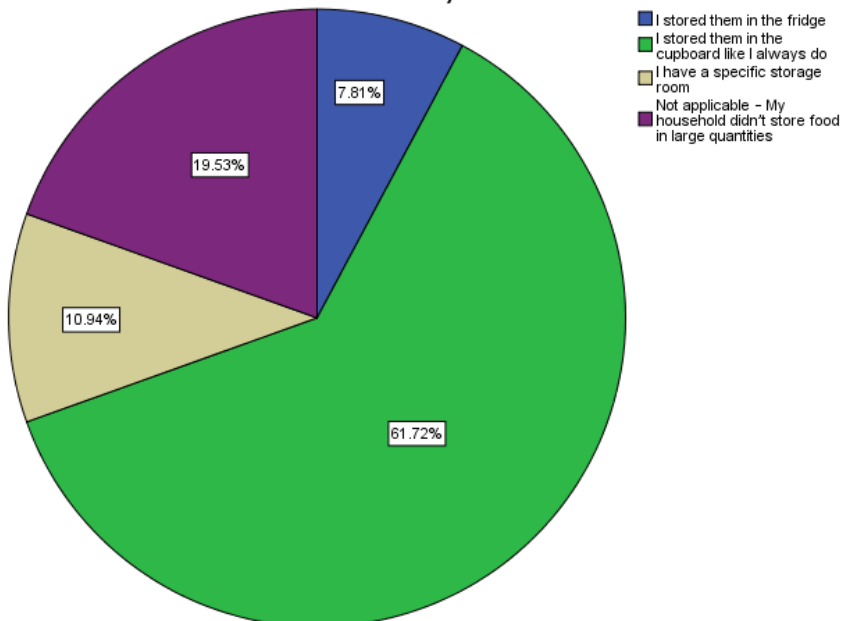


Figure 10: Dry products storage

Finally, during Covid-19, 37.6% of the respondents snacked more, while 12.8% snacked less, 40.4% kept the same snacking habits as before and the remaining respondents weren't sure of their snacking habits while filling the survey. Their primary snacks were vegetables and fruits, followed by salty unhealthy snacks like chips, pretzels, or roasted nuts (Figure 13). The healthy food snacking habits reported in this survey, was not consistent with the literature, since in other researches, people were snacking more and eating ultra-processed, unhealthy snacks (Ammar et al., 2020). For example, in Italy during lockdowns, people increased their consumption of processed "comfort foods", like chips, chocolate... (Scarmozzino et al., 2020). In Denmark, the same pattern as in Italy was observed, where higher rates of emotional eating was observed compared to pre-Covid-19 period, with an increase in the consumption of sweet pastries and alcohol (Giacalone et al., 2020). As for the ones in our study that were not sure of their snacking habits, no particular explanation can be given since that cannot be retrieved from the online survey. However, a study in Denmark, Germany and Slovenia found that "what is considered to be a snack may not always be clear to consumers, as the same food may be a snack or part of a meal depending on when and how it is consumed" (Janseen et al., 2020), and that can be one of the potential factors affecting the answers of the respondents to this particular question.

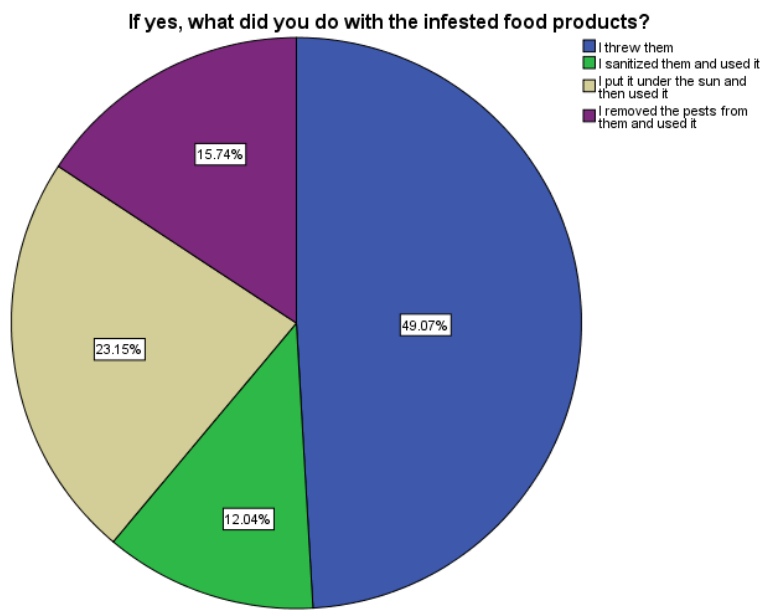


Figure 11: Behavior towards infested food products

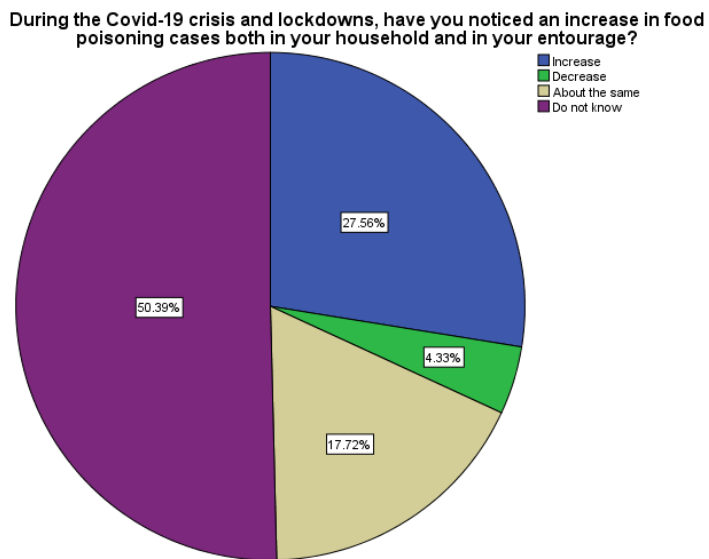


Figure 12: Food poisoning cases during Covid-19

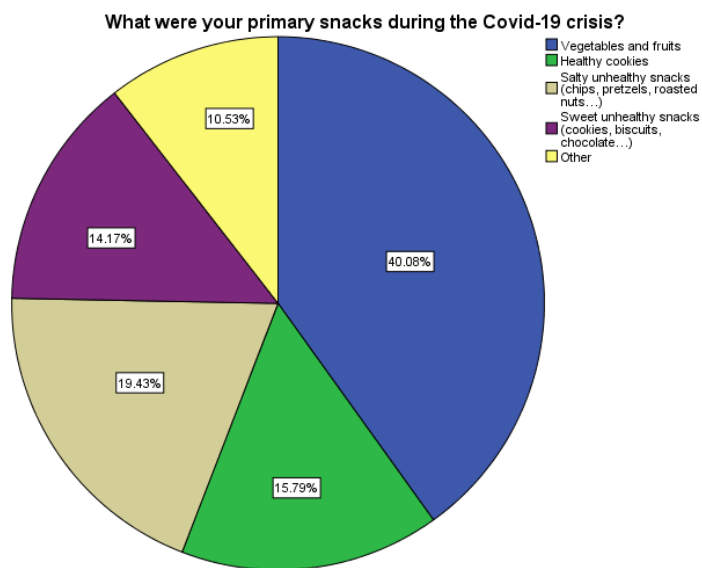


Figure 13: Main snacks during the Covid-19 crisis

D. Correlations between different factors

Statistical tests were performed to assess correlations between household sociodemographic characteristics, purchasing power, and access to financial assistance. Households attending the low status schools were more likely to report lower purchasing power as a result of the economic crisis (Table 4). In parallel, the same pattern was observed when comparing how much of their household monthly income was spent on food. This is the same as Engle’s law stating that “as household income increases, the percentage of that income spent on food declines on a relative basis” (Hayes, 2022).

Table 4: effects of the Lebanese economic crisis on the purchasing power of the 3 schools

The effects of the Lebanese economic crisis on the purchasing power of the households				
Children's school	Increase in purchasing power	Decrease in purchasing power	The purchasing power stayed the same	Total
School A	2.2%	54.9%	42.9%	100.0%
School B	8.2%	29.4 %	70.9%	100.0%
School C	11.7%	83.5%	4.9%	100.0%

Another factor that was crucial to look at was the quality of foods the household consumes, across different socioeconomic backgrounds. Here again, those who were from a higher socioeconomic background perceived less of a change in the quality of foods they are consuming post-economic crisis than those from a lower socioeconomic background, meaning that there was a statistical significance between these two factors; one was affected by the other. However, the perception of food safety and the food safety illnesses in the households were not correlated with the schools, as their p-values > 0.05. This means that, no matter the school or the socioeconomic background, the food safety knowledge and its effect on the population was the same. Also, the food poisoning incidents at the household level were not affected by the different socioeconomic statuses, they were independent. No significance was seen as well, for the primary cook of the household (majorly the mother) compared to the food safety incidents in the household. This means that, whether the mother cooks or another person does the cooking, the food safety incidents in the household will stay the same.

It is interesting to see the correlation between the population's consumption of local or imported foods, with their perception of the quality of foods they are eating lately (better or worse than pre-economic crisis). The Chi-square test for the comparison of these two had a significance level (p-value > 0.05), suggesting that there is no

correlation between the factors. This means that, the study population did not perceive that local foods are lesser or better in quality than imported ones. Also, the households that mostly changed their used brands, are those that after the economic crisis are eating more local products than imported ones. This could mean that some people who used to eat imported products changed to local ones; whereas those who can afford to get imported foods, stuck to the same brands they used to eat.

E. Contributions and Limitations

Our study differentiates from other studies because it takes into consideration two factors - Covid-19 and economic crisis - simultaneously. It also looks at the effects of those two factors on two variables: food behaviors and food safety. That said, some findings of our research are unique in their nature or in the Lebanese setting. An interesting point of view for this study is that, those who did the pre-test to check if everything was comprehensible and clear before sending the surveys to the schools and parents, said that they had a hard time differentiating between the Covid-19 era and the economic crisis in Lebanon. That is because, in Lebanon, both of those crises happened simultaneously. Lebanon is unique in this situation. Other countries who are going through both crises, didn't have the same timeframe. For example, in Venezuela, the economic crisis first appeared in 2010 and it got worse with time (Coronel, 2017). However, the Covid-19 crisis, a global pandemic happened starting 2020. Lebanon went through these crises simultaneously, as they almost started together.

To add, the crises have affected everyone in Lebanon, regardless of their socioeconomic background, with some people more affected than others. This was made clear by this study, even though our sample focused on three schools

(convenience sample), and does not represent the Lebanese population from different regions. Also, when tackling food safety topics, people could be not aware how to identify it, making them under-report it, especially that the effects of the crises on food safety was according to the perception of the participants, making it complicated to interpret and understand its exact effect.

CHAPTER V

CONCLUSION

Lebanon is going through major economic and Covid-19 crises that have caused changes in food behaviors and have affected food safety. The Lebanese population, regardless of their socioeconomic situation, has been seeing and feeling the effects of these crises in their day to day life. The crises have affected the whole study population, however there are many aspects that those who were from a lower socioeconomic background felt more than those from higher socioeconomic backgrounds. Here, it was according to the Engel's law. However, that was not always the case: in some aspects, the socioeconomic backgrounds did not affect the effects of the crises on the individuals. For example, people were not affected by their socioeconomic backgrounds when recalling their self-reported food safety incidents. A recommendation would be to further study the food behavior changes and food safety after these crises. The research should be extended to other regions in Lebanon in order to see if the results are consistent or not.

This study found significant changes in household food consumption behaviors linked to Covid-19 and economic crises, even among higher socioeconomic segments. These behaviors have to do with where people consume food, the types of food eaten, and the quality. The changes in foods consumed may lead to different vectors for food-borne illness in the Lebanese population.

There is limited evidence – but widespread perception – that food safety has declined (reported as higher incidence of food-borne illness) in Lebanon as a result of overlapping crises. This explains that more research is needed, specifically to examine the effects of two major crises on food safety in Lebanon. Further epidemiological

research is also needed about this topic, to scientifically prove the potential increase in food safety incidents in Lebanon. Also, food safety trainings should be given in schools, in order to understand the symptoms of food safety sicknesses and correctly identify them.

APPENDIX I

Table 5: Food consumption frequency before vs. after the economic crisis, and the % change

	Pre-Crisis				During Crisis				Change (pre- to during)			
	Every day	At least once a week	At least once a month	Never	Every day	At least once a week	At least once a month	Never	Every day	At least once a week	At least once a month	Never
Red meat	19.2%	72.7%	6.1%	2.0%	7.8%	43.4%	38.5%	10.2%	-11.4%	-29.3%	32.4%	8.2%
Poultry	8.6%	82.9%	6.9%	1.6%	3.3%	54.1%	34.4%	8.2%	-5.3%	-28.8%	27.5%	6.6%
Fish	2.0%	32.4%	46.3%	19.3%	0.4%	15.0%	28.3%	56.3%	-1.6%	-17.4%	-18%	37%
Grains	29.5%	67.2%	2.9%	0.4%	34.8%	57.0%	7.0%	1.2%	5.3%	-10.2%	4.1%	0.8%
Bread	95.5%	4.1%	0.4%	0.0%	94.7%	4.9%	0.4%	0.0%	-0.8%	0.8%	0.0%	0.0%
Pasta	8.2%	82.9%	8.6%	0.4%	11.2%	73.6%	13.2%	2.1%	3.0%	-9.3%	4.6%	1.7%
Rice	22.4%	73.5%	3.7%	0.4%	24.6%	69.7%	5.3%	0.4%	2.2%	-3.8%	1.6%	0.0%
Milk	68.2%	18.4%	8.2%	5.3%	51.7%	23.1%	12.0%	13.2%	-16.5%	4.7%	3.8%	7.9%
Dairy products	80.8%	14.3%	2.9%	2.0%	56.6%	24.4%	13.6%	5.4%	-24.2%	10.1%	10.7%	3.4%
Deli products	29.0%	40.7%	17.0%	13.3%	13.0%	21.3%	30.1%	35.6%	-16%	-19.4%	13.1%	22.3%
Canned products	13.1%	44.7%	30.3%	11.9%	10.4%	21.7%	42.5%	25.4%	-2.7%	-23.0%	12.2%	13.5%
Fruits	77.9%	15.2%	4.1%	2.9%	50.6%	32.4%	9.5%	7.5%	-27.3%	17.2%	5.4%	4.6%
Vegetables	79.2%	18.0%	2.4%	0.4%	57.9%	36.0%	5.4%	0.8%	-21.3%	18.0%	3.0%	0.4%
Raw nuts	7.0%	42.1%	28.5%	22.3%	3.3%	21.5%	24.8%	50.4%	-3.7%	-20.6%	-3.7%	28.1%
Salty snacks	15.5%	59.6%	15.9%	9.0%	8.6%	35.8%	31.3%	24.3%	-6.9%	-23.8%	15.4%	15.3%
Sweet snacks	35.9%	46.5%	11.0%	6.5%	13.2%	38.0%	30.6%	18.2%	-22.7%	-8.5%	19.6%	11.7%

APPENDIX II

Table 6: Food products that household stored in large quantities, during the Covid-19 crisis

	Frequency
Red Meat	13.3%
Poultry	12.9%
Fish	1.1%
Grains	65.8%
Bread	40.7%
Pasta	58.9%
Rice	67.3%
Milk	35.7%
Dairy products	20.2%
Deli products	4.2%
Canned products	35.7%
Fruits	17.5%
Vegetables	18.6%
Raw nuts	8.4%
Salty snacks	11.4%
Sweet snacks	14.1%
Do not know	1.1%
None	17.1%

APPENDIX III

Questionnaire:

All the questions are optional.

Module A - Sociodemographic characteristics

1. How many children do you have?
[open ended- number]

2. What is/are the age(s) of your child/children?
[open ended number]

3. Which school does your child/do your children attend?
[open ended question]
4. How many people in your household are employed at the moment?
[open ended-number]

5. What is the highest level of education that you have completed?
 - a) 9th grade in school, Brevet
 - b) Technical degree (BT...)
 - c) Baccalaureate
 - d) Undergraduate level (BS, BA, BE...)
 - e) Master's degree
 - f) Doctoral degree
 - g) Other, please specify

6. What is the approximate monthly income of your household?
(if your household monthly income is completely or partially in USD,
kindly convert it to L.L. according to the daily market rate).
 - a) <1,000,000 L.L.
 - b) 1,000,000- 3,000,000 L.L.
 - c) More than 3,000,000- 5,000,000 L.L.
 - d) More than 5,000,000- 8,000,000 L.L.
 - e) >8,000,000 L.L.

7. Have you or your household been receiving any financial assistance
during the economic and Covid-19 crises?
 - a) We have gotten assistance before but are not getting any at the
time being.
 - b) We have gotten financial assistance before and still are getting it
at the time being.
 - c) No we haven't.

8. What was the form of assistance you or your household are receiving / have received? (Indicate all that apply.)
- a) Cash money in U.S. dollars
 - b) Cash money in Lebanese Pounds (LL)
 - c) Food stamps
 - d) Food boxes
 - e) Not applicable, since I didn't get any assistance
9. Who is primarily responsible for preparing/cooking food for the children in your household?
- a) Mother
 - b) Father
 - c) Grandparent
 - d) A helper/cook
 - e) An older child
 - f) Other, please specify

Module B - The effects of the economic crisis on food consumption behaviors

10. How has the economic crisis in Lebanon affected the purchasing power of your household?
- a) Increase in purchasing power
 - b) Decrease in purchasing power
 - c) The purchasing power stayed the same
11. Approximately how much out of your household income per month did you spend on food **before** the economic crisis in Lebanon?
- a) <10%
 - b) 10% -19%
 - c) 20% -29%
 - d) 30% -39%
 - e) 40% -49%
 - f) 50% -59%
 - g) 60% -69%
 - h) >70%
12. Approximately how much out of your household income per month do you spend on food now, **during** the economic crisis in Lebanon?
- a) <10%
 - b) 10% -19%

- c) 20% -29%
- d) 30% -39%
- e) 40% -49%
- f) 50% -59%
- g) 60% -69%
- h) >70%

13. At the time being, does your household consume more local or imported products as compared to the pre-crisis period?

- a) Local
- b) Imported
- c) Do not know

14. **Before the economic crisis**, which types of foods did your household consume on a regular basis? Indicate all that apply. *

Food	Frequency			
	Every Day	At least once a week	At least once a month	Never
Red meat				
Poultry				
Fish				
Grains				
Bread				
Pasta				
Rice				
Milk				
Dairy products				
Deli products				
Canned products				
Fruits				
Vegetables				

Raw nuts				
Salty snacks				
Sweet snacks				

15. **During the economic crisis**, which types of foods did your household consume on a regular basis? Indicate all that apply. *

Food	Frequency			
	Every Day	At least once a week	At least once a month	Never
Red meat				
Poultry				
Fish				
Grains				
Bread				
Pasta				
Rice				
Milk				
Dairy products				
Deli products				
Canned products				
Fruits				
Vegetables				
Raw nuts				
Salty snacks				
Sweet snacks				

16. What was the reason of this shift?
 a) They are very expensive

- b) I am worried about their safety
 - c) Their quality is not as good as before
 - d) The dietary preferences in the household changed (switching to vegetarianism, veganism...)
 - e) I cannot find my preferred foods in the shops
 - f) Not applicable, since my diet did not change
17. Have you perceived a change in the quality of foods your household has been eating lately (comparing it to pre-economic crisis period)
- a) Yes
 - b) No
18. After the economic crisis, did you switch from using certain brands of food products to using other brands of the same food product?
- a) Completely – My household has changed all brands of food products from those previously consumed.
 - b) Mostly – My household has changed most brands of food products from those previously consumed.
 - c) Minimally – My household has changed a few brands of food products from those previously consumed.
 - d) Not at all – My household has not changed any brands of food products from those previously consumed.
19. What was the reason of this switch?
- a) They are very expensive
 - b) Their quality is not as good as before
 - c) I cannot find my preferred brands in the markets
 - d) Not applicable, since I'm still using the same brands I used before

Module C - The effects of the economic crisis on food safety

20. With the ongoing electricity cuts in Lebanon, how do you store perishable foods?
- a) In the fridge, but I check the temperature frequently
 - b) In the fridge, however I don't find it necessary to check the temperature of the foods frequently
 - c) In the freezer, as I feel it is safer

d) I don't buy in enormous quantities to avoid the problem of storage with electricity cuts

21. Have you changed your food storage means, compared to pre-economic crisis, because of the recent electricity cuts?

- a) Yes
- b) No

22. Have you or anyone from your household suffered from food poisoning in the past 12 months?

- a) Yes
- b) No
- c) Do not know

23. If you or someone from your household suffered from food poisoning in the past 12 months, what was the suspected source of illness?

- a) Home cooked food
- b) Restaurant food (eat-in)
- c) Take away/delivery food (eat at home)
- d) Do not know
- e) Not applicable – My household has not experienced food poisoning in the past 12 months.

24. Do you think that the number of food poisoning incidents in Lebanon has increased during the last 12 months?

- a) Yes
- b) No
- c) Do not know

Module D - The effects of the Covid-19 crisis on food consumption behaviors and food safety

25. During the Covid-19 crisis, have you been eating more home-cooked or ready to eat foods (i.e. take away...) than the pre-Covid period? *
- a) Home cooked
 - b) Ready to eat
26. During the Covid-19 crisis, which food products did your household store in large quantities? (Indicate all that apply.)
- a) Meat
 - b) Poultry
 - c) Fish
 - d) Grains (lentil...)
 - e) Bread
 - f) Pasta
 - g) Rice
 - h) Milk
 - i) Dairy products (labne, cheeses...)
 - j) Deli products (charcuterie)
 - k) Canned products
 - l) Fruits
 - m) Vegetables
 - n) Raw nuts
 - o) Salty snacks (chips, pretzels...)
 - p) Sweet snacks (cookies, biscuits, chocolate...)
 - q) Do not know
 - r) None, my household didn't store food in large quantities.
27. Why did you store those food products?
- a) To make sure the household does not run out of food
 - b) To increase food, as the household was consuming more food at home.
 - c) To have pass-time foods in the house, for when we are bored
 - d) Because the food products started getting more expensive, so I was saving by buying those foods beforehand at a lower price
 - e) Do now know
 - f) Not applicable – My household didn't store food in large quantities.
28. Why did you refrain from storing some food products in big quantities?
- a) I didn't have enough storage space

- b) I didn't have enough freezer space
- c) I did not want to panic
- d) I found it unnecessary to store big quantities of food products
- e) Not applicable- My household stored everything needed in large quantities

29. How did you store the large quantities of fresh products (meat, poultry, eggs, dairy products...)?

- a) I bought a new freezer to store the big quantities
- b) I bought quantities that fit in my freezer
- c) I didn't buy big quantities of fresh products because I don't have a storage place.
- d) Not applicable – My household didn't store food in large quantities.

30. How did you store the large quantities of dry products (lentils, rice, pasta, flour...)?

- a) I stored them in the fridge, etc
- b) I stored them in the cupboard like I always do
- c) I have a specific storage room
- d) Not applicable – My household didn't store food in large quantities.

31. How did you make sure that the large quantities you bought remained safe to eat? Indicate all that apply.

- a) I wasn't worried about the dry foods
- b) I looked at the expiry dates before buying them
- c) I was not worried about food safety, the important part was to not run out of food
- d) I constantly checked for physical evidence of food spoilage (molds, insects...)
- e) I tried to implement some food safety practices
- f) Not applicable – My household didn't store food in large quantities.

32. Have you had any pest infestation on your grains, other food products... during the Covid-19 lockdowns? *

- a) Yes
- b) No

33. If yes, what did you do with the infested food products?
- a) I threw them
 - b) I sanitized them and used it
 - c) I put it under the sun and then used it
 - d) I removed the pests from them and used it
34. During the Covid-19 crisis, have you snacked more or less than you did before this crisis?
- a) I snacked more
 - b) I snacked less
 - c) My snacking habits stayed the same
 - d) Do not know
35. What were your primary snacks during the Covid-19 crisis?
- a) Vegetables and fruits
 - b) Healthy cookies
 - c) Salty unhealthy snacks (chips, pretzels, roasted nuts...)
 - d) Sweet unhealthy snacks (cookies, biscuits, chocolate...)
36. During the Covid-19 crisis and lockdowns, have you noticed an increase in food poisoning cases both in your household and in your entourage?
- a) Increase
 - b) Decrease
 - c) About the same
 - d) Do not know

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