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Maternal education and employment status' effect on household food security among Palestine refugees in Lebanon

Master's thesis in Global health
Supervisor: Muhammad H. Zaman
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Abstract

Background: Food insecurity is a major problem worldwide, and one population exposed are Palestine refugees. Food insecurity can put these refugees at risk of malnutrition and other health issues. This study investigates the food insecurity among these refugees in Lebanon and discusses it with relevant theory on education, employment, health and other factors that are included in the UNICEF malnutrition framework. These are factors that are connected in a feedback loop and affect each other. Working towards increasing food security and improving factors in this loop is important. The objectives of this study were to examine the relationship between maternal education and employment, and household food security among Palestine refugees in Lebanon. Further we wanted to see how this was affected by other household variables and to use this information to understand what this means for the population's food security and health.

Design and methods: This is a quantitative study based on data collected by researchers from the American University of Beirut and The United Nations Relief and Works Agency for Palestine Refugees (UNRWA), originally for the Survey on the Socioeconomic Status of Palestine Refugees in Lebanon from 2015. The analysis was done using Stata software to do chi-square tests, scatter plots and logistic regression analyses.

Results: There is a clear relationship between maternal education and household food security, and higher education decreases the odds of severe food insecurity. Being unemployed increases the odds of food insecurity. Both effects are seen among mothers and heads of households, but the overall effect is bigger for heads of households. All regression models were significant (p=0.000).

Conclusion: This study has shown that there is a relationship between maternal education and household food security, and that mothers with higher education have a significant protection against both mild/moderate and severe food insecurity. The significance for severe food insecurity was still present when adjusting for all included variables. This study highlights parts of the complexity of the situation and show that focus on improving access to education for women can be of great value for the future of the Palestine refugee population in Lebanon.

Keywords: mother, maternal, education, employment, Palestine, refugees, Lebanon, Beirut, UN, UNRWA, health, food security, nutrition, quantitative, regression, Stata.

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I would also like to thank my supervisor, Dr. Muhammad Zaman, for help with finding a project and putting me in contact with all the right people. Thank you for all your feedback and guidance throughout the entire project.

Lastly, my family and especially my sister. Thank you for cheering me on.

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Abbreviations

AFFSS	The Arab Family Food Security Scale
AUB	The American University of Beirut
FHH	Female Headed Households
FI	Food insecure
FS	Food secure/security
HH	Head of household
HHDS	Household Dietary Diversity Score
MFI	Mild to moderate food insecurity
MHH	Male Headed Households
NCDs	Non-communicable diseases
NSD	Norwegian Social Science Data of Service
OR	Odds ratio
PRL	Palestine Refugees in Lebanon
PRS	Palestine Refugees from Syria living in Lebanon
REK	The Regional Ethical Committee for Medical and Health Research Ethics
SFI	Severe food insecurity
SSPR	Survey on the Socioeconomic Status of Palestine Refugees in Lebanon 2015
UNRWA	United Nations Relief and Works Agency
UNSCOP	United Nations Special Committee on Palestine
WHO	World Health Organization

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Introduction

Food insecurity is a problem present worldwide and is considered a big problem for health and nutrition. It can lead to nutritional deficiencies, physical disease and influence the mental health of those suffering from it. Among the Palestine refugee population in Lebanon food insecurity is a big problem, and just one of many problems they suffer under. This thesis aims to examine the food insecurity in this population and some of the aspects that might influence it, especially looking into the mothers in the population and their education and employment status. For this purpose, data material from the Survey on the Socioeconomic Status of Palestine Refugees in Lebanon from 2015 will be analyzed and discussed in the light of relevant literature on socioeconomic status, health and nutrition.

Background

Many aspects of a person's life affect their health; from genetics, the environment we grow up in, to what choices we make our self. Health is much more than the absence of disease, it includes physical, mental and social well-being, as well as being able to cope with the challenges of everyday life (Braut, n.d.; World Health Organization, n.d.). Health is affected from the time of conception, and the first 1000 days of a child life is of great importance for their health (UNICEF, 2013).

Mothers education and employment

Many variables affect health outcomes of children, including genetics, nutrition, a range of environmental factors, access to health care services, hygiene and their parent's abilities to make good health choices. Research shows that there is a relationship between mothers education and their children's health, and that mothers with higher education have children who suffer less from malnutrition (Abuya, Ciera, & Kimani-Murage, 2012). Two Norwegian reports from 2005 and 2014 have looked at how socioeconomic status is connected to health and social differences in the Norwegian population (Dahl, Bergsli, & van der Wel, 2014; Næss, Rognerud, & Strand, 2007). The report from 2005 showed that socioeconomic status is closely connected to people's health, and that parent's socioeconomic status affects their children's health in several aspects (Næss et al., 2007). This report measured socioeconomic using income, education and employment status. In Norway more men than women are employed, although the differences are smaller than ever before (Dahl et al., 2014). In Norway and Europe in general, those who have higher education are more often employed compared to those with lower or no education. In addition, not having work generally leads to poorer health, both physically and mentally.

Parents' socioeconomic status affects their children's health in different ways, and the first part of a child's life is highly affected by their mothers health and status (Næss et al., 2007). Mothers with higher education give birth to children with a higher birthweight, and they nurse their children for longer, while mothers with lower education have a higher risk of giving birth to premature babies (Dahl et al., 2014; Næss et al., 2007). A school reform in Norway increased the number of compulsory years of schooling from seven to nine years, which in turn lowered the risk of low birth weights of children born from mothers this reform affected (Grytten, Skau, & Sørensen, 2014). A survey looking at 42 developing countries from 2006

also showed a positive association between maternal education levels and their children's health outcomes (Boyle et al., 2006). This shows that both basic education and higher education have positive effects on health outcomes of children in both high- and low-income countries. Education transfers to knowledge which makes these mothers likely to have good nutrition both before and during pregnancy, and to be more careful to provide nourishing food and clean water for their children (Abuya et al., 2012; Fogstad, 2013). Higher education makes mothers more able to recognize illness and makes them more likely to seek health care services, and to provide their children with education and vaccines. Children of parents with lower education are more likely to have chronic diseases like asthma and eczema, more likely to be overweight, be less active, and have poorer nutrition (Dahl et al., 2014).

In both the Norwegian reports referenced here, socioeconomic status is used as a whole, and for the most part only education level, and not employment, is separated out to see how it affects the health of parents and their children (Dahl et al., 2014; Næss et al., 2007). In Norway income, education and employment, the three measurements of socioeconomic status, are closely connected, and usually those with higher education are employed in jobs with higher pay. There is less information on employments affects alone, but we see that job insecurity creates general insecurity in Norwegian households and affects the mental health of the families. Parents job status also influence children's performance at school, and those with better paying, more secure and steady jobs have children who perform better and are less likely to drop out of school. The likelihood of children attending higher education increases when parents have higher socioeconomic status.

Nutrition and food security

Nutrition is "the intake of food, considered in relation to the body's dietary needs", a cornerstone for good health, and an important part in reducing the prevalence of both mental and physical problems (WHO, 2017). What eating a balanced and healthy diet entails varies with both personal and cultural factors, but the basic principles remain the same; fruits and greens, whole grains, lean meat and not too much salt, sugar or fat (WHO, 2018). A nutritious diet can help prevent malnutrition in different forms, in addition to a variety of diseases and ailments such as unhealthy weight variation, non-communicable diseases (NCDs), tooth decay, increased blood pressure and cardiovascular diseases.

Mother's nutrition

Both in high and low income settings a mother with good nutrition both before and during pregnancy, especially in combination with breastfeeding, can have a considerable positive effect on their children's health (Quisumbing, Brown, Feldstein, Haddad, & Peña, 1996). This will affect the children's birth weight and their nourishment after birth, making them more likely to have a normal growth. Being born premature can have negative effects on a child's health, both short and long term, and birth weight is considered the most important determinant for a child's survival and growth the first part of their life. Low birthweight and premature birth is similarly correlated with adverse outcomes related to growth, cognitive development and education (Dahl et al., 2014).

A study from the slums of Nairobi in 2012 found that maternal education was a strong predictor of child nutrition and stunting in the area (Abuya et al., 2012). Stunting is defined as inadequate length/height for age, and captures early exposure to undernutrition (UNICEF, 2013). The authors propose that improved access to education, especially among the female children would be a contributor to reducing poverty in this urban poor setting and thereby improve nutrition in the population. The researchers also suggested that an inclusion of health knowledge skills in the education, further improving the knowledge of future mothers.

Food security

Food security is defined as present when "all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (Ghattas, 2014). In many places, including the middle east, there are societal and cultural norms which put a big part of the responsibility of ensuring that each family member, especially children, have enough food, on the women in the households, while the man in the household is responsible for earning money and providing for the family in that sense (Quisumbing et al., 1996). But food security includes more than having enough food to combat the feeling hunger, it is also about the "hidden hunger" which refers to micronutrient deficiencies, a prevalent problem among populations with a diet lacking diversity (Ghattas, 2014).

The United Nations has made 17 Sustainable Development Goals (SDGs), and the hope is to reach these by 2030 (United Nations, n.d.). Goal 2 is "zero hunger" and a big part of this is assuring food security worldwide. Among the aspects that makes this goal a challenge there is

the continuing population growth in some of the exposed regions, and the changing diets in different parts of the world (Breene, 2016). We experience climate change that affects weather and causes both drought and flood, which in turn makes food production more challenging. These are all factors that makes providing food security around the world problematic, but as it is an important part in in securing optimal nutrition, working for solutions becomes an important job worldwide (Ghattas, 2014).

Child nutrition

Poor nutrition can be detrimental for children, and can have irreversible consequences (UNICEF, 2013). Undernutrition can lead to stunting, which can stay with the child throughout their entire life. These children will be more likely to become overweight later in life, are more prone to NCDs and are often discriminated in their work life. Poor nutrition early in life can reduce a child's chance for survival and have consequences that can last a lifetime, including type two diabetes and impaired cognitive, neurological and emotional development (Gordon & Halileh, 2013; UNICEF, 2013). Living in a household with food insecurity makes children more likely to have a poor diet quality, and possibly poor nutritional status which can have consequences for their development (Chaaban et al., 2015).

The undernutrition among children is assessed by measuring weight and height, and by screenings (UNICEF, 2013). Several measures are used; stunting, as defined above, wasting (inadequate weight for height) and underweight. Today there is more focus on preventing stunting, as this is an irreversible condition with serious long-term effects, including increased risk of morbidity, delayed development and mortality.

UNICEF framework for undernutrition

UNICEF has developed a conceptual framework of the determinants of child undernutrition, show underneath in figure 1 (UNICEF, 2015). This maps the basic, underlying and immediate causes of undernutrition, how they are connected and how these affects each other, the short-term and the long-term consequences for individuals, households and society. One of the basic causes is "Household access to adequate quantity and quality of resources", among these education and employment. The basic causes can lead to the underlying causes, including inadequate feeding, disease and household food insecurity which all lead to maternal and child undernutrition. The consequences of this undernutrition can again lead to the underlying causes, creating an unfortunate feedback loop.
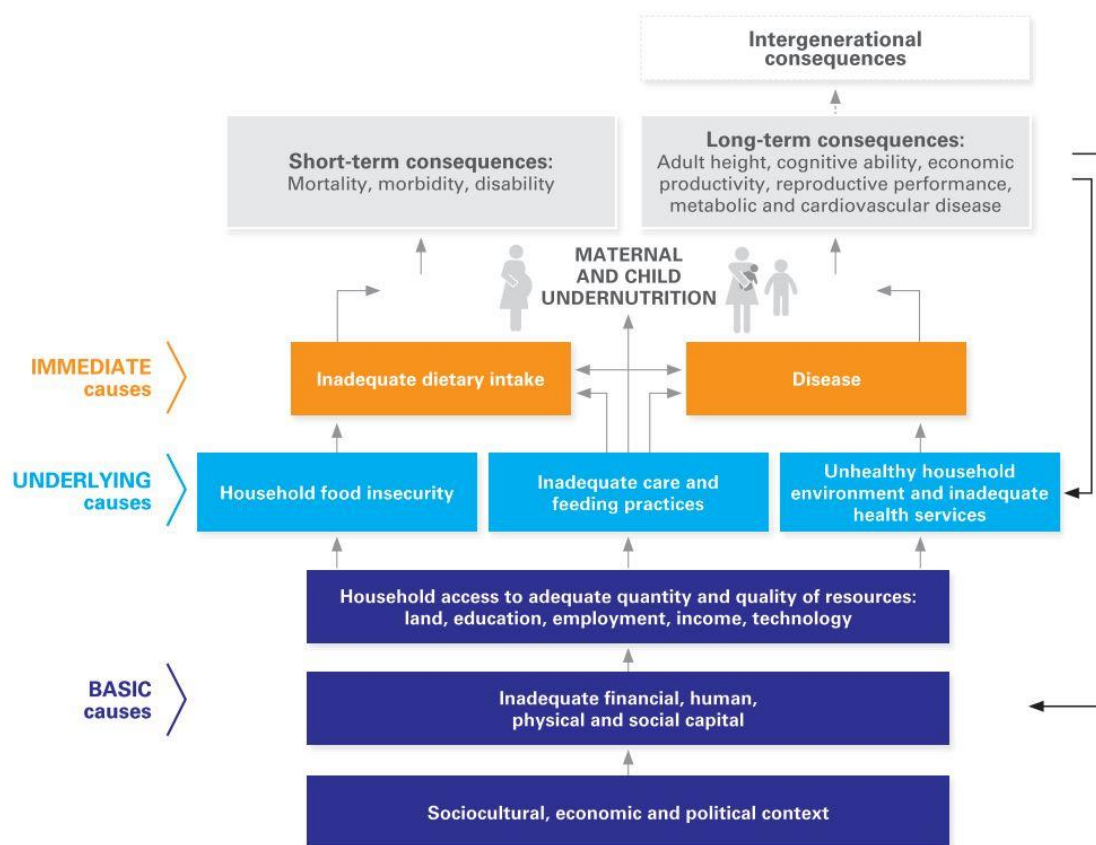
Figure 1: *UNICEF conceptual framework of the determinants of child undernutrition. From the report "UNICEFs approach to scaling up nutrition for mothers and their children".*

This framework captures the multifactorial causality of undernutrition, and shows how nutritional status of children are influenced by three main factors: dietary intake, disease/health and care (UNICEF, 2013). It shows that there are many factors which can lead to household food insecurity, and how that in turn can have consequences (UNICEF, 2015). In addition to food insecurity being a part of the causes for undernutrition, infection can prevent proper absorption or utilization of nutrients, and a poor diet can compromise the immune system, making children more susceptible to infection (Ghattas, 2014). Food insecurity and other causes and consequences in this framework are all complex issues, and as this framework illustrate, there is not one single aspect that needs to be improved in order to solve either of them, but many (UNICEF, 2015). The first part of a child's life is a crucial time for preventing malnutrition, highlighting the importance of the nutritional status and knowledge on food health and care among women who are or plan to become pregnant.

Refugees and the Israel-Palestine conflict

Refugees are men, women and children who have fled their country, many because of war and having to leave their possessions, homes and loved ones behind (UNHCR, n.d.). The 1951 Refugee Convention defined a refugee as "someone who is unable or unwilling to return to their country of origin owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group, or political opinion" (UNHCR, 2010). At the end of 2017 there were 25,4 million refugees registered across the world.

One of the situations that has led to a big part of this high number of refugees is the Israeli-Palestine conflict. This conflict has been going ever since the end of the first world war, when the first discussions about who should own and rule Palestine and surrounding areas started (Waage, 2013). The area called the Mandatory Palestine was a result of negotiations between France and Great Britain (GB) after the first world war, and since 1920 it was ruled by GB. This include the areas which are now Israel, Jordan, the Westbank and the Gaza Strip. From this time on Palestinians and the Jewish population have been in conflict about power and domination of the area. The leader of the Zionist group fighting for a Jewish Palestine, David Ben-Gurion, said that "*We and they want the same thing: We both want Palestine. And that is the fundamental conflict*" (Waage, 2013).

After years of conflict United Nations Special Committee on Palestine (UNSCOP) was formed, and they suggested a way to split the areas which gave areas to both parts and left Jerusalem as an international area (Waage, 2013). This resolution passed in the United Nations General Assembly the 29th of November 1947 and the unrest started the next day. Both parts thought their share of land was too small and did not accept the resolution. A week later the fights had spread all over Palestine. On the 14th of May the following year Ben-Gurion declared Israel as a state and became its first prime minister. The new country was soon recognized by both Russia and the United Stated of America. The Arab states did not recognize Israel, and launched an attack the following day, with a goal to crush Israel before they had a real change to establish the country. This started the conflict which has lasted ever since. The war that started it all has been heavily disputed. This is what Israelis call their War of Independence, while Palestinians calls it al-Nakba – the catastrophe, or the Palestinian exodus.

While the immigration of Jews to Israel were increasing Palestinians were fleeing in big numbers (Waage, 2013). From December 1947 to March 1949 almost 750 000 Palestinians had fled from their homes, leaving everything behind. Most fled to neighboring countries, including 455 373 Palestinians who fled to Lebanon in the north of Israel and Palestine. Lebanon is a small country, with a population of under 6 million people; despite this they have the highest concentrations of refugees per capita worldwide (BBC News, 2018; UNHCR, 2014)

Palestinians in the near east

UNRWA

Following the Israel-Palestine conflict The United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA) was established and have been present in the near east for nearly seven decades (UNRWA, 2015). Their services include 143 health centers spread out across the area, which services about 3,5 million out of the around 5,7 million Palestine refugees. Refugees are defined as above, but additionally UNRWA defines a Palestine refugee as "persons whose normal place of residence was Palestine during the period 1 June 1946 to 15 May 1948, and who lost both home and means of livelihood as a result of the 1948 conflict." a definition which includes the descendants of those living in Palestine before the conflict (UNRWA, n.d.-f). As of July 2014, almost 450 000 Palestine refugees were registered with UNRWA in Lebanon (UNRWA, 2014). Palestine refugees in Lebanon (PRL) are legally prevented from owning property, and 53% are reported to live in one of the 12 Palestine refugee camps (Chaaban et al., 2015). Compared to the region as a whole, where 29% of Palestine refugees are reported to be living in UNRWA camps, this is a large share (UNRWA, 2015). Following the conflict that broke out in Syria in 2011 many more Palestine refugees have been forced to flee to Lebanon in search of safety (UNRWA, 2014). As they are not formally citizens of Lebanon PRL lack important rights, such as access to education, employment and public health services. Most of these refugees live in overcrowded spaces with poor housing conditions and two-thirds are considered to be poor or extremely poor (UNHCR, 2016). As a UN organization the work UNRWA does, and the services they provide, are mostly funded by UN member states. The US has been one of the major donors, and in 2017 they funded almost 30% of UNRWAs operations (BBC news, 2018). The following year their funding was cut in half, putting a major strain on UNRWAs budget and future work.

Health challenges

The health and delivery of health care services among Palestine refugees are heavily affected by the instability caused by local conflicts in the region. The region faces many big health challenges, and with an aging population the disease burden is changing; NCDs are an increasing threat in several parts of the region, which causes a greater workload for the health staff, in addition to a financial challenge. On the other hand, communicable diseases are under control, and diseases related to personal hygiene as well as sanitation.

When looking at the different parts of the region one can understand the complexity of the challenges UNRWA and the populations in the area are facing. Many of the problems in the different areas are similar, like the lack of rights for the refugees, the NCDs, constant psychological stress and food insecurity (UNRWA, 2015). In addition to this factors like poor economic conditions and lack of jobs add directly to the food insecurity in the region (Gordon & Halileh, 2013).

But we also see that specific problems are bigger some places than others. In the Gaza strip the lack of infrastructure and trouble with power cuts causes difficulties, in addition to big problems with most Palestine refugees not being able to cover their daily calorie need (UNRWA, n.d.-d). The Palestine refugees in the West Bank struggles with displacement and military violence, and do not have access to essential services (UNRWA, n.d.-e). In Jordan most of the Palestine refugees have been granted citizenship and have access to health care services, but those without citizenships are left vulnerable (UNRWA, n.d.-a). Since the conflict in Syria broke out the Palestine refugees there have been an especially vulnerable population, and even if there was health centers many have been forced to close down, and accessing those who are left is often both difficult and dangerous (UNRWA, n.d.-c). Both the physical and mental health of the population suffers greatly because of this.

One of the major problems in Lebanon is the many restriction the Palestine refugees face when it comes to rights and privileges, including access to the health care services (UNRWA, n.d.-b). The challenges are many, and one of the major problems is the infrastructure and overcrowded living conditions. There is a wide range of challenges in the near east, and UNRWA is continuously working together with several partners to protect the health of this refugee population (UNRWA, 2015). The turmoil in the region creates a lack of durable solutions in many places, which affects both the physical and mental health of the refugees.

One of the big problems in the entire region is food insecurity, and the consequences it carries, including micronutrient deficiencies.

PRL in Lebanon

Education

Since Palestine refugees in Lebanon have limited access to the Lebanese school systems, they have to rely on UNRWA to get access to education (Chaaban et al., 2015). Lebanon is the only place UNRWA provides secondary education, since most PRL would not be able to get higher education without this offer. The school enrolment has increased since the last survey in 2010, and 97% of school-age children are enrolled at the elementary school level. But there are still only 61% of those in the age range for secondary school who were enrolled in 2015. Higher education is too expensive for most PRL, even though they have the same fees as their Lebanese counterparts. UNRWA also awards a few scholarships to outstanding students each year. Compared to 2010 the percentage who have a Brevet or a Baccalaureate degree is higher (Chaaban et al., 2015).

The share of women that never attended school is higher than males, with 15.8% compared to 6.7% (Chaaban et al., 2015). The average illiteracy rate is 8% - higher among females- and only 6.2% of PRL above 25 years old holds a university degree. Improved access to education tend to raise the average income levels, especially among women (Quisumbing et al., 1996). And women are, compared to men, more likely to spend their income on food for their families, increasing food security in the household.

Employment

In 2010 and 2012 the unemployment rate among PRL were like the Lebanese rate of 8%, but in 2015 the rate had increased to 23.2% (Chaaban et al., 2015). The rate was higher among women than men. This is the strict definition of unemployment: the ratio of those actively looking for work, unlike those too discourage to do so and are not looking for work (Chaaban et al., 2010). In 2010 this rate was much higher than those looking for work, at 56%. Meaning that the rate of so called "discouraged workers" was much likely higher in 2015 as well. Most of employed PRL are working in low-paying, low-skilled, often under poor conditions and with only a verbal agreement with their employer, meaning the employment can be ended at any time.

Food security

In the socioeconomic survey from 2015 food insecurity is assess using the Arab Family Food Security Scale (AFFSS)(Chaaban et al., 2015). This showed that only 38% percent of PRL respondents were considered food secure (FS), leaving 62% being mild to moderately food insecure (MFI) (38%) and severely food insecure (SFI) (24%). Compared to the data from SSPR in 2010 the prevalence rates were almost unchanged, then 61.5% where food insecure (FI), but it seems 4% of households had gone from MFI to SFI. The report also shows that 27% of PRL children under 15 live in SFI households and more FI households included a member with a chronic or acute illness. A higher proportion of female headed households are FI, but the difference is not significant. In addition to this the dietary diversity decreases with increasing FI.

Employment and education in relation to food security

The SSPR shows that among PRL household food insecurity increases if the head of household (HH) is unemployed, and that employment protects from all levels of FI (Chaaban et al., 2015). Of the SFI households 56% have an unemployed HH, while in MFI households 44% were unemployed, and 42% in FS households. PRL having a lower skilled job are more prone to SFI, connecting FS status, employment and poverty. Income is a determinant for obtaining food, and being unemployed and poor is a big threat to household FS (Quisumbing et al., 1996). If the HH has a Brevet, this protects the household significantly against all levels of FI (Chaaban et al., 2015). Brevet is the certificate a student in Lebanon receives upon completion of middle school, which enables them to enter secondary school. 80% of households who were SFI reports that the HH does not have a Brevet. These connections are prevalent in homes with both male and female HHs.

Rationale

Rationale for the study

The Palestine refugee population are still facing many challenges, including increasing NCDs, lack of rights to land and work, poor living conditions and economic difficulties. One of the pressing challenges is food security, putting them at risk of serious malnutrition and other ailments. The PRL population is particularly vulnerable as the food security challenge is made more complex by the lack of access to health care and work, in addition to poor infrastructure and overall housing conditions. Women in the region in general have low education, have less

access to paid jobs and are often responsible for taking care of the children in the households. We know that parent's socioeconomic status, education and employment status are important for health outcomes both for parents and their children, but there is still a need for information about this in the PRL population. Our goal in this thesis is to investigate how mother's education and employment status affect the household's food security status and the health of the children in the household. Our results will help to assess if access to education among women can influence future food security in the population and thereby help determine the best approaches in handling this challenge and provide better services for the population.

Objectives and research question

Purpose of the study

The aim of this study is to examine the relationship between maternal education and employment, and household food security using data from the "Survey on the Socioeconomic Status of Palestine Refugees in Lebanon", a survey conducted by The American University of Beirut (AUB)/UNRWA in 2015. The survey and sample information are presented below. We will also go into how this relationship can affect the health and environment PRL children grow up in. This can provide more knowledge on the subject that can be valuable for future efforts in improving the situation among Palestine refugees both in Lebanon and other parts of the region.

Objectives:

- To analyze the relationship between maternal education and employment, and household food security among Palestine refugees in Lebanon.
- To adjust for other variables and see how they affect this relationship.
- Using the theory to understand and discuss these relations, what they can mean for the PRL population and children, and what is can mean for their health.

Research question

How does maternal education and employment status affect household food security, and thereby the environment children grow up in, among Palestine refugees in Lebanon?

Materials and methods

Presentation of dataset

The data used for this project is from the Survey on the Socioeconomic Status of Palestine Refugees in Lebanon from 2015 (SSPR). This survey was conducted by a team from AUB based on a corresponding survey from 2010 and both were commissioned by the United Nations Relief and Works Agency (UNRWA) (Chaaban et al., 2010). One of the goals of the first report was to "guide UNRWA policy and develop policy recommendations based on data gathered through the household survey" and to evaluate the poverty among Palestine refugees in an evidence-based and comprehensive way. The 2015 report wanted to build on the acquired knowledge from 2010 and get a broader overview of the situation of this population. It came at a time critical for this group of refugees, following the Syrian crisis and the addition of over one million new refugees in Lebanon (Chaaban et al., 2015). The survey covers both Palestine refugees in Lebanon (PRL) and Palestine refugees from Syria living in Lebanon (PRS), but the data are presented separately. This is because these two groups are in different situations, as PRL have been living in Lebanon since 1948, while PRS came more recently in 2011. This project only uses the data on PRL.

Sample

The target sample size was calculated to be 2816 households, using the calculation in appendix 1 (Chaaban et al., 2015). A household in this context is defined as "a group of people who have been living together for over six months and who share their food and budget". Households from all twelve official Palestine refugee camps were included. After sampling and excluding non-eligible households, 2974 households completed or partially completed the interviews and were included in the study.

Data analysis

Weighing the data

Before the analysis the data was weighted in Stata software using the "*svyset*" command. Weighting is used to make the data more representative of the whole population at hand, which is relevant here as the data is collected from 12 different camps, and the population samples are of different sizes and characteristics in each place (Johnson, 2008). This can include distribution of gender, housing conditions, education, age and other factors. In this

case the sample population is much smaller in Bekaa valley, since most of the population here is PRS, not PRL. The distribution of the final population can be seen in figure 2 in the results. To use this in the further analysis the command "*svyset*" was added before every tabulation, in the regression models and when making graphs and figures sampling weights were used.

Defining measurements

The measurement definitions used in this thesis are the same as are being used in the SSPR. This is mainly to have a clear frame of reference in this thesis, and to compare results with those from SSPR to insure they are reasonable. The measurement definitions are created by researchers at AUB who are more familiar with the topics at hand, including food security, the educational system in Lebanon and the work environment PRL are in.

Measuring food security using the Arab Family Food Security Scale

To measure the household food security levels in the PRL population the *Arab Family Food Security Scale* was used. This is a scale developed and validated for vulnerable populations in Lebanon (Sahyoun et al., 2014). The scale is made up of seven questions which were included in the questionnaire used to collect the data. Each question gives a score of 0 or 1 and the categories of food security is coded as 0-2 FS, 3-5 FI, 6-7 SFI. The scale was developed to be culturally appropriate, and a quick and inexpensive way to measure food insecurity among the growing refugee population in the region.

For the analysis these levels were further divided up. In order to use logistic regression, there needed to be binary outcomes, so there were created two different divisions:

- FS and FI. Here the scores of 3-7 was included in the food insecure category, including both MFI and SFI.
- Non-severely food insecure and SFI. Here the scores of 1-5 was in the first category.

In addition to now being able to use logistic regression this also allows to see how much different variables affect the outcomes of any kind of food security and the severe food insecurity, which is of interest to distinguish between.

Mothers and children

In the SSPR children are defined as those under the age of 15, and adults as 15 years and over (Chaaban et al., 2015). In this thesis children will have the same definition, and they will be a part of defining the mothers.

The data from SSPR does not specify whether a participant is a mother, or when there is a mother-child relationship in a household. Because of this limitation some assumptions must be made in order the define what a mother is for the analysis. For this context the biological aspect of being a mother is not of great importance, but it is the function of a female caretaker. If a female of reproductive age function as a caretaker in a household with children, she will for in every practical sense function as a mother. Reproductive age is defined as 15-49 years by the World Health Organization (WHO, 2016). In order to exclude young mothers and get a cleaner result the age limit of the analysis is will be 18-49 years. With these factors in mind mothers are defined as women of reproductive age who shares housing with at least one child. In some households this description will fit for several participants, then the oldest one will be defined as the mother. This will in a few cases mean that the oldest daughter if defined as the mother, if the mother is older than 49, which can be a limitation and could in theory affect the results. But this is the case in very few households, and the oldest daughter here will in many cases function as the caretaker and therefore be the best fit for the analysis.

Using this definition, the final population used for the analysis included 1524 mothers. Some were further excluded because of missing data on food security, leaving 1503 for the final analysis. It would be possible to divide both number of children in the household and the mothers age into categories, to treat them as categorical values rather than continuous variables. This was tested with different cut off point, but only seemed to cause loss of information, and the variables were kept continuous.

Education

Education is divided into several different levels, as there are big variations in this population. The starting point is twelve categories, the same twelve used in SSPR. Each participant was asked about the highest level of schooling achieved, and these twelve were the alternatives.

- Never Attended
- Elementary – Not completed

- Elementary – completed
- Preparatory – No Brevet
- Preparatory – Brevet
- Secondary – Without Baccalaureate
- Secondary – With Baccalaureate
- Vocational or Technical – without Certificate
- Vocational or Technical – with Certificate
- University – without Degree
- University – with Degree
- University – Post Graduate

Using all twelve levels would make further analysis overly detailed and complicated, so there was made four new categories to make the analysis less complicated. The cut-off points were sat at "Never attended", "Elementary – completed", "Preparatory – No Brevet" and the remaining categories into one "Brevet and higher". This could cause us to miss some of the details about the part of the population with higher education, which in countries like Norway would make a big difference in an analysis like this because of the general level of education in the population. But in this population the general education is low, making the lower levels more important to distinguish between.

Employment

Respondents' employment status will be divided into four categories: employed, unemployed, and two groups who are not working and not looking for work.

- Employed are defined as working one hour or more per week at any job that pays or as being employed but has not started at the job. It also includes those who are on sick leave or vacation.
- Unemployed includes participants who wants to work but are not able to find a job.
- Not working or looking for a job because they are a housewife or raising children.
- Not working or looking for a job for any other reasons. These reasons include lost hope of finding work, disability or illness, pregnancy, social pressure and fearing to be detained.

Statistical Methods

Cross tabulation and Pearson's chi-squared tests

Cross tabulations with calculations of the chi-square was used to assess if there was a significant relationship between the categorical values and the outcome variable, food security (Statistics Solutions, 2019). The most important relationship to examine was between the mother's education level and the household food security. In order to move on with the analysis it was important to determine that there was a possible relationship to examine further. Using the weighted data, the chi-square test was done, both for the FI and SFI variables. Tests were also done to check for other significant relationships between the household food security and other variables, such as the HHs education and employment, the numbers of children in the household and the age of the mothers.

Logistic regression

For the main analysis logistic regression was used for assessing the relationship between the independent variables and the binary dependent variable: food security (Ranganathan, Pramesh, & Aggarwal, 2017). Stata has several different commands for logistic regression, among them "*logit*" or "*logistic*". They are both used for binary outcomes, but "*logit*" gives coefficients, while "*logistic*" gives odds ratio (OR) in the output (*Stata manuals: logistic*, n.d.; *Stata manuals: logit*, n.d.). Other than this they are equal and provide the same results. Several studies have used logistic regression to look at similar relationships before. An American study looking at food insufficiency, family income and health in children used logistic regression models to examine food insufficiency as a predictor of poorer health (Alaimo, Olson, Frongillo, & Briefel, 2001). And a Canadian study used is similarly, to assess risk of FI among Aboriginal households compared to non-Aboriginal households (Willows, Veugelers, Raine, & Kuhle, n.d.). Both studies created several models to adjust for other variables, such as household demographics, similarly to what will be done in this project. Using previously done research "*logit*" was chosen, both because this was suitable for the research question and because OR is less complicated to interpret. The OR is the odds of something occurring over the odds that it won't (Ranganathan, Aggarwal, & Pramesh, 2015). An OR of 1 means that there is no difference in odds between the two outcomes, while a higher than 1 or lower than 1 OR indicate higher or lower odds for the reference group in the regression.

Variables that were relevant and significant in relation to the food security in the chi-square tests were to be included in the regression models. The variables were grouped into maternal characteristics and household characteristics. This led to these three regression models:

- Model 1: Maternal characteristics – education, employment, age and number of children.
- Model 2: Household characteristics – HHs education and employment, household size and number of children.
- Model 3: Variables from both models combined.

For the models only variables that were shown to be related to food security were chosen, since including many independent variables can dilute the model and the true associations (Ranganathan et al., 2017). Dividing the regression into three models was done to be able to look at how the mothers and HH affected the household FS status separately, and whether there were significant relations, before combining them.

Ethics

The project was conducted in cooperation with AUB and as a part of the project two trips to Beirut were made to visit camps and the university. These trips were in October 2018 and February 2019 and totaled five weeks. In order to approve the use of the data for this study, an online ethics course was conducted, and a data sharing agreement was signed, a requirement set by the internal review board. Prior to interviews used for data collection participants were told about the project and informed consent was obtained (Chaaban et al., 2015). Since no new data was to be collected for this thesis no new consent will be required from the participants.

Norwegian Social Science Data of Service (NSD) considered the project to not need their approval. An application was sent to The Regional Ethical Committee for Medical and Health Research Ethics (REK). REK considered the project to be outside the remit of the Health Research Act 2008 and concluded it could be implemented without their approval.

Results

## Cross tabulations and Pearson's chi-squared tests

The tabulation showed that there is a significant relationship between maternal education and FS, both for the FI and SFI categories, with a p-value = 0.000. The output can be seen in appendix 2. The percentage with both any kind of FI and SFI decreased with increasing education levels among mothers. This is the same pattern as when looking at HH's education, although the percentage of both FI and SFI is higher overall. The tabulations of employment status both for mothers and HH shows that the unemployed population is most exposed to both FI and SFI. Out of those who are unemployed 76% of HH and 78% of mothers are FI, while 43% (heads) and 49% (mothers) are SFI. The tabulations of mother's employment were not significant for FI (p=0.1113), but significant with a p-value = 0.0009 for SFI.

For number of children there was a significant p-value for FI, not for SFI, but both showed an increase in FI/SFI with higher number of children. For FI there was a gradual increase going from 61% FI with one child, to 89% with seven children. For SFI there was a gradual increase from 25% to 28% from one to six, then 47.8% for six children and 77.8% for seven children.

When looking at age there was no significant relationship, but an overall increase with the increased age for both FI and SFI. There was no significant p-values when looking at household size either.

Food security in different regions

There are five regions in Lebanon used in SSPR, and food insecurity is a pressing problem in all of them, as shown in figure 2. Overall the population is 34.01% FS, 39.68% FI and 26.31% SFI, as shown in the characteristics in table 3 in appendix 3. CLA is the region which are worse off, with the highest amount of SFI, and the lowest amount of FS at 27.1%, followed by Tyre at 31.9% and Bekaa at 32.5%. Tyre have the lowest percentage of SFI but have quite low FS and the highest percentage of MFI.
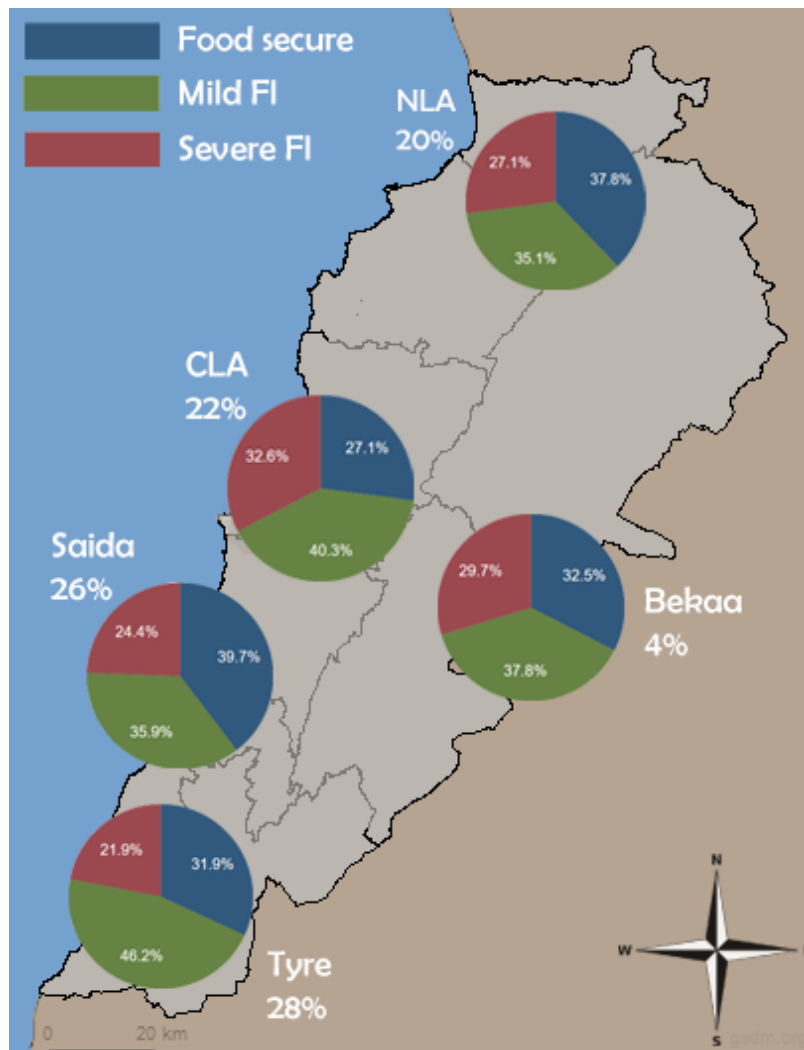
Figure 2: *The three categories of food security/insecurity and percentages of the respondent population in the five regions of Lebanon: North Lebanon (NLA), central Lebanon/Beirut (CLA), Bekaa valley, Saida and Tyre.*

Characteristics among mothers

Table 3 in appendix 3 shows some of the basic characteristics of the mothers in the population. It shows that most of the population studied are not working because they are housewives (78%), and most suffer from some form of food insecurity (65.99%). We see that only 2.99% of this population have no education, and the biggest group who are FS are those with Brevet or higher education. In addition to this it shows that most of the mothers have 1-3 children, and that the age groups are evenly spread out. Among those employed the biggest group are FS, and smallest SFI, while in the unemployed the trend goes the other way. Similar trends are shown among those with no education versus those with higher education, the SFI are higher for those with no education, and FS is higher for with higher education.

Distribution of education and food security by employment

The scatter plots below (figure 3) show the distribution of education and FS for each employment category. Unlike the characteristics table the percentages are based on the employment group, not the whole population of mothers, and show the education level at the same time which provides a clearer picture of each of the subgroups. The education levels are the same as in table 3, where 1 is no education up to 4 for Brevet and higher. All employment groups have very low percentages of no education, since there are only a handful of mothers with no education which we also see in table 3.

Among the employed population the majority have higher education, and the biggest subgroup are those who have Brevet or higher and are FS, followed by the group with similar education who are MFI. The employed group have a higher prevalence of FS than the population in general, of 40.8% compared to 34.01%. There is only 20.5% who are SFI in the employed group, compared to the general population who have 26.31%. The unemployed population show a different picture, with 49% SFI. The SFI subgroup have similar education levels, except no one with no education. The education levels here are also similar as among the employed population and the majority have Brevet or higher, but the group is in general more skewed towards SFI.

The two groups who are not working have similar distribution of FS/FI, with the biggest group in both subgroups being MFI, and similar numbers in FS and SFI. Among housewives the biggest group are those with level 3 education, while "not working, other reason" are more evenly distributes with a small majority on level 4.
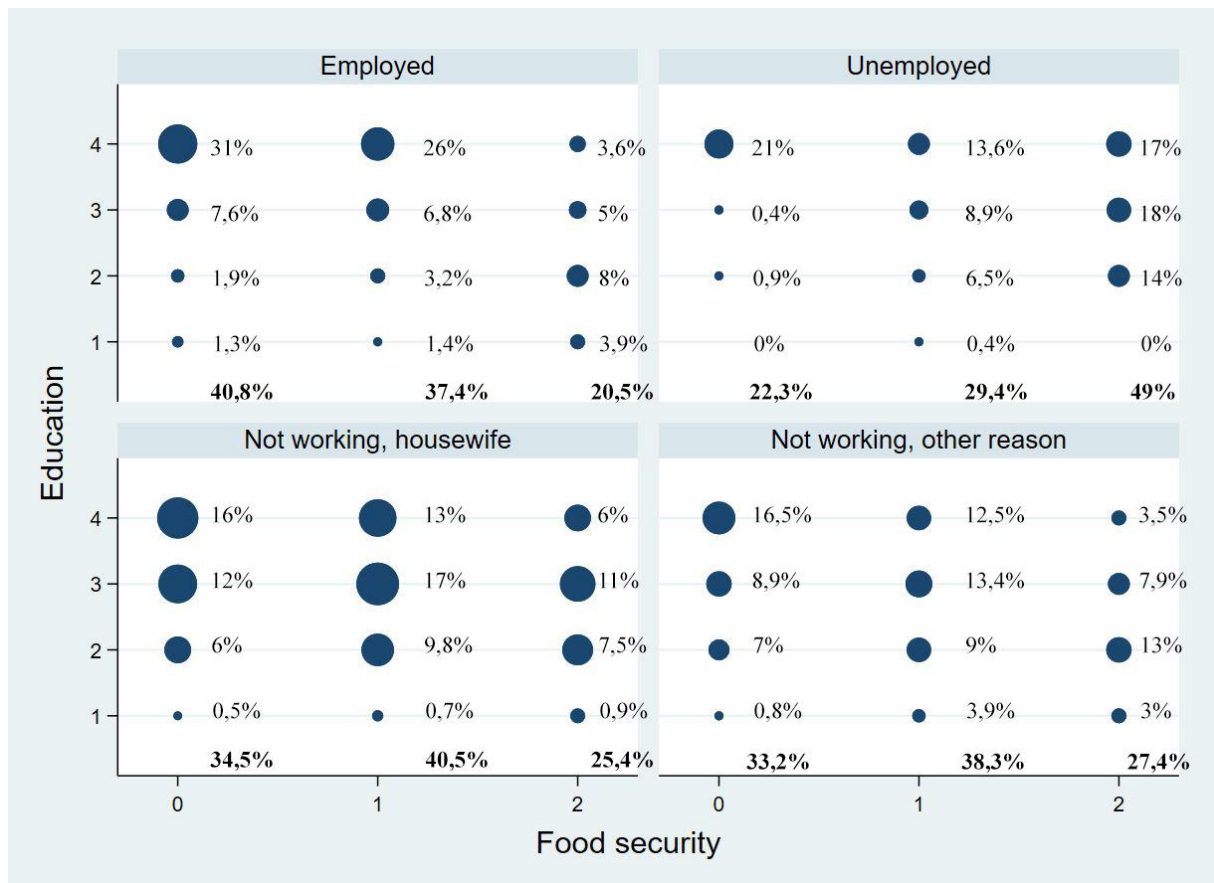
Figure 3*: Scatter plot of food security by education, divided by employment categories. The percentages in bold is the collected number for the FS categories within each group.*

Regression analysis

As describes in the methods we divided the variables into three models to examine the effect of mothers' and HH characteristics on household FS levels before combining them. Especially looking at mothers on their own was of importance for this project. All the regression models were executed with the "*svyset*" command in order to adjust the data for the different sample sizes, which gave the models an adjusted "population size" of around 28 000 people. All models were statistically significant with a p-value of 0.0000. Edited versions of the output from the regressions can be seen in appendix 4, only OR with associated confidence intervals and p-values for each variable in the model is included to make the tables more readable.

Model 1

The OR of FI/SFI is calculated compared to no education, and is decreasing as the level of education increases, but is not significant for elementary or preparatory. Looking at Brevet and higher there is an OR of 0,29 for FI and 0,24 for SFI with p-values of 0,020 and 0,002

respectively. The unemployed mothers had 2,48 times higher odds of FI and 3,86 times higher odds for SFI compared to no education with a p-value at 0,019 and 0,000. For the groups who were not looking for work the odds were somewhat higher compared to the employed group, but not significant for FI or SFI.

The age of the mother had a significant OR of 1,02 for SFI but not for FI. For the number of children in the household it was the opposite, with a significant OR of 1,15 for FI, but not for SFI.

Model 2

Similar trends for the education levels, but in this model the HHs with preparatory education have a significantly lower OR compared to no education for SFI, in addition to for FI in the group with Brevet and higher. The OR for both mothers and HH are similar for FI, starts lower for SFI but here they have the same value for Brevet or higher of 0,24.

The unemployed HHs also had significantly higher odds of both FI and SFI with ORs at 2,49 and 3,21 respectively. For those not working the HHs who were housewives had no significantly different odds, while those not looking for work for other reasons had a significant OR of 2,0 for SFI with a p-value of 0,003.

The household size had no significance for either FI or SFI. The number of children in the household had an OR of 1,15 for FI, with a p-value of 0,032, while a non-significant OR of 1,04 for SFI.

Model 3

In the third model all variables are included. For Brevet and higher among mothers the OR is now 0,44 and 0,32 for FI and SFI respectively, and only significant for SFI (p=0,031). The same trend of lower OR for each level of education is still present both for mother's education and HH's education, somewhat higher values for mothers in SFI, similar for both groups in FI. For HH the ORs for Brevet and higher is 0,42 (p=0,019) and 0,35 (p=0,005) for FI and SFI.

The unemployed mothers had 1,83 times the odds of FI compared to the employed mothers in this model, which was not significant, while the odds of SFI was 3,33 times that of the employed, with a p-value of 0,002. For the HH, the OR for both FI and SFI was like those in

model 2 at 2,43 ((p=0,008) and 3,24 (p=0,000). The OR of 2,04 for HH who were not looking for work for other reasons was also significant (p=0,002).

The age of the mother was significant both for FI and SFI with ORs at 1,02 and 1,03, and the number of children in the household had a significant OR at 1,20 (p=0,005) for FI and 1,08 for SFI which was not significant.

Discussion

Summary of findings

The analysis showed that there is a significant relationship between both FI and SFI, and education among mothers. The relationship between maternal employment and FI was non-significant, while with SFI it was significant. Unemployed mothers were most exposed to both FI and SFI, while mothers who were both highly educated and employed was the biggest group within employment status who were FS. Most mothers in the population were not working because they were housewives, and only 7.81% are employed. All regions of Lebanon had high percentages of FI and SFI, but CLA had the highest values of SFI and lowest FS.

All three regression models had significant p-values, with ORs getting lower with increasing levels of education both for FI and SFI. This was similar in model 1 with mothers and model 2 with HHs. ORs were significant for those unemployed in both model 1 and 2. For HHs the OR for both FI and SFI were significant, while only for SFI for mothers.

Food security

Levels of FS were similarly distributed among mothers as in the population in general or HHs, which is to be expected. Most families consist of a male HH and their wife, so numbers are therefore likely to be similar when looking at either HHs or mothers.

The UNICEF framework shows that household FI, leading to inadequate dietary intake, together with disease/health and care are three factors which together are important causes for children's health and nutrition (UNICEF, 2013). In addition, household FI will cause decreased dietary diversity for the household in general, and as we see from Dahl et al., poor nutrition before and during pregnancy can lead to low birthweight for new born and other detrimental consequences (Chaaban et al., 2015; Dahl et al., 2014). These things are affected

by several basic causes and they all form the complexity of the challenge to secure children's FS. We see that in this population only 34.01% are FS, leaving almost 66% of households FI and SFI. 4% had gone from being MFI to SFI since 2010, making the issue even more pressing. Being FI is part of a loop of causes and consequences and they are all interconnected, making the problem hard to tackle, especially in a population where so many of the causes are present. Mapping the problem and how the causes are connected is an important step in order to see what can be done to tackle this issue. One of the main reasons SFI is increasing can be the increase in population since 2010, meaning there are more people to share the limited resources (Chaaban et al., 2015).

Education

As we see in the reports by Næss et al. and Dahl et al. the elements of socioeconomic status are closely connected in Norway (Dahl et al., 2014; Næss et al., 2007). They present how being higher education makes you qualified for higher paying jobs, and that this will make you more financially secure and perhaps create more job security. Having higher education is also connected to more knowledge on health, leading to healthier families and children. In theory this can apply to PRL as well, but there are more factors complicating the picture in this population. Some of these are included in the model, while other are not and will be discussed later in this report. While looking at the scatter plot (figure 3) the majority (60.6%) of the employed population have Brevet and higher, and only 3.6% of these respondents are SFI out of 20.5% in the employed population overall. This might indicate that education increases the chances of having a job, and it also seems that those with higher education and employment are more prone to FS and less to SFI, similarly to what we see in the Norwegian reports. This shows that the connection between education, employment and health outcomes might be present even among PRL.

SSPR shows that education enrolment both for elementary and preparatory school has increased since 2010, and the rates are higher among female students (Chaaban et al., 2015). This might be part of the explanation why so few mothers in the analysis have no education. In the general population 11.7% have no education, but since the enrolment has been going up the mother included would have been part of the increase that started in 2010, or even before this. Their mothers, on the other hand, might have lower education, but are not included in this analysis because of the age limitations, and this might be part of the explanation to why

the percentages are as low as 2.99%. How small this group is, becomes more apparent in the scatter plots (figure 3) as well, where they are barely visible. The enrolment for preparatory and secondary are lower than for elementary and decreasing the dropout rates could be an important step in order to help decrease FI, in addition to keeping the enrolment for elementary as high as in 2015, when 97% of school age children were enrolled.

We see in the analysis that there is a significant relationship between maternal education and FS levels in the household, as the chi-square test is significant for both FI and SFI. This substantiates what the scatterplots shows. This test also shows that the highest level, Brevet and higher, protects against any form of FI, and that the prevalence of FI decreases with increasing education. This is similar to what is found in SSPR when looking at the household as a whole, and here when looking at the HHs education level, indicating that the education of the HH has an important effect on the household FS (Chaaban et al., 2015). The relationship between FS and education is clearer when we look at HH, with higher prevalence of FS, and lower prevalence of SFI. This could be caused by those mothers who are unmarried, and more exposed to FS than a HH who is male would be, causing a difference in FS status.

The first regression model support what the chi-square test showed, that mothers with education has a significant impact on household FS and that Brevet and higher is protective against all forms of FI. The regression shows more clearly that increasing education decreases FI/SFI, as the OR gets lower for each level of education. This demonstrates that even if all forms of education are shown to have a positive impact the effect of education and the accompanying knowledge that might decrease FI/SFI it's only the higher levels we can state has a warranted effect (Grytten et al., 2014). The education level in this population is in general low, and this might make the impact of maternal (and paternal) education and the knowledge about food and nutrition that might follow smaller when even the third level of education in the analysis, preparatory, is still considered low education when compared to high income countries (Chaaban et al., 2015). For the HHs, we find the same trends as for mothers; FI/SFI gets lower for higher education levels, but significant at preparatory level for SFI as well. This could imply that the education of the HH has more impact on the household's FS levels, which I will discuss further down. In addition, the ORs for SFI start lower, indicating that even lower levels of education can have a certain effect, though not significant at elementary levels.

In the third model we can see a bigger picture, and the ORs for education have increased slightly (differences from 0,06-0,14) for all levels in both FI and SFI except for elementary education and SFI for mothers, which decrease with 0,02. Including all the variable has changed the effect of mother's education, and the P-value for Brevet and higher and FI is no longer significant, and neither is preparatory and SFI for HH. This can be because the effect is smaller when adjusted for other variables included in the model that is part of the explanation of the FS level.

We see that the HHs education most likely have a bigger effect on the households FS, which can be expected as HH is usually responsible for earning money in order to provide for the household (Quisumbing et al., 1996). In many countries in the Middle East, including Lebanon, stereotypical gender roles still exist, and many believe that women should not work outside the home – but rather take care of the chores in the house (Lyons, 2017). Similarly, many say that it is more important to educate boys than girls. This can be part of the explanations of some of the results in this thesis, especially how the HHs education and employment status has more effect on the households FS levels. For most of the households the head is the father/husband/grandfather, and they are traditionally expected to take care of their family, making their education and employment more impactful on FS. Despite these believes being present United Nations and others are working towards improving the situation and the access to education and work for women, in order to generate more gender equality and create the economic gains employed women can lead to (Ennaji, 2018; United Nations, 2019)

Despite the changes of ORs in the third model the initial results are still presents; higher education is protective against household SFI for both HH and mothers, and protective against any form of FI for HHs education. According to Quisumbing educating mothers is likely to raise income, which they are more likely to spend on food compared to the men in the family (Quisumbing et al., 1996). In this population this link might not be as direct. The scatter plot indicates that educated mothers are more likely to have work, but the education is not more effective for mothers, which might have to do with the traditional gender norms mentioned above. In addition to spending income differently maternal education can be a strong predictor for the quality of child nutrition and possible stunting, like we see in Nairobi and the UNICEF framework (Abuya et al., 2012; UNICEF, 2013). Higher educated mothers also have

better nutrition during pregnancy, which is linked to the same outcomes. This is not examined in this thesis but is most likely a link present among PRL as well and an important consequence of FI and low dietary diversity.

Employment

As discussed in the previous part it seems there is a similar connection among PRL, as in the Norwegian reports, between education and employment, and the consequent health outcomes. Figure 3 shows that the employed population have the highest prevalence of FS, and the lowest of SFI, and that the FS is higher with more increased education as well. The relationship between employment status and FS in the household is established with the significant chi-square test, and the unemployed population is the most exposed to FI and SFI among the four groups, both for HHs and mothers. We could theorize that having an employed mother could affect the household FS both in a negative or positive way: an employed mother might not have enough time to care for her children and provide them with proper nutrition, or an employed mother is more likely to have more knowledge and to know better how to best provide for her children. In this case the second theory might be true, as FS is highest in the employed population. Since it seems those with education are more likely to have a job this might be caused by employment and the following income, knowledge provided by education or a combination, in addition to other variables that come into play.

As we see in figure 3, 49% of unemployed mothers are SFI, and 43% of HH are as well. But for those mothers who are not working or looking for work only 25.4% and 27.4% are SFI for housewives and those not working for other reasons respectively. Since 2010 the unemployment in the population has increased, which could be part of why more people are now SFI as mentioned above, since this is clearly connected to FI (Chaaban et al., 2015). Those who are housewives can be somewhat protected against SFI by a husband or father, the HH, which can be employed and have an income. The mother is not the traditional bread winner, and this might be part of the explanation why the prevalence of SFI is so much lower than among the unemployed. This might also explain the lower prevalence among those not working for other reasons, as they might also be protected to a degree by other family members or the HH. 1260 of the mothers in this population are wives of the HH and only 49 mothers are HH themselves. This means that the possible protection against FI from a husband/father who is HH will be important in this population. The mothers who are

unemployed are defined as searching for work, meaning that they need work in order to make ends meet. So, they might not have the same protection or family members with income, and therefore they are more exposed to SFI than the other groups. Those mothers not working or looking for work for any reason, most probably have protection in some way, and not an equal need of work as unemployed mothers might have. In addition to the lack of income and protection searching for a job in a country where one does not have the same rights as the general population, with a limited job market will cause a lot of stress. It might also cause a mother to be away from her home for long periods of time and takes away from the time she has available to care for her family and children, time the mothers who are not looking for work might have. Inadequate care and an unhealthy household environment are part of the underlying causes of malnutrition from UNICEFs framework, which is part of the feedback loop and can over time be another part of the explanation of why the unemployed population are less FS.

Among the unemployed mothers the biggest group is that of those who have Brevet and higher, and who are also FS. This could imply that this level of education is protective against FI and SFI even when the mothers are unemployed. At the same time both FI and SFI with Brevet and higher are among the largest subgroups of the unemployed population, which goes to show that even if it might have a protective effect to some degree, being unemployed and searching for a job can be detrimental for household FS for different reasons, and that it's impossible to explain and solve such a complex problem with one variable alone. Among the mothers who are not working (housewife/other reason) both FS levels and education are more evened out, and the link between FS and education does not seem to be present in a similar way.

The regressions substantiate what the previous analysis shows and makes it clear that the unemployed population have higher odds of being FI/SFI compared to those employed (appendix 4). They also show that the mothers who are not working for any reason have non-significantly higher odds of FI/SFI compared to those employed. As discussed above this their family in other aspects. Regression model 2 shows that this can be the case, as HHs who are not working (for other reasons than being a housewife) have twice the odds of SFI compared to those employed, but no significantly higher odds of FI. This continuous to be true in model 3 when adjusting for other variables, where the OR for SFI and HHs not working has even

increased. In model 1 and 2 all unemployed have a significant OR for both FI and SFI. This continuous to be significant for HHs in both FI and SFI, but only for SFI for mothers. All the other ORs for the unemployed group remain high and significant and is at 3,33 for SFI for mothers and 2,43 and 3,24 for HHs, substantiation both that being unemployed have a big effect on the households FS and that the mother's effect is less significant than the HH. This is like what we see in SSPR where having an unemployed HH increases the prevalence of FI.

The difference in ORs for mothers and HHs who are not working for other reasons is worth noting. For SFI this OR is significant for HH at 2,04, while non-significant at 1.16 for mothers. This might be explained by the gender roles in the region; as previously mentioned, the man in the family are more often expected to provide for the household and might be why the heads employment status is significant for this employment category while the mothers do not have the similar result. This expectation might also cause stress, like for those who are unemployed, connected to providing for the family and causing the negative loop we see from the UNICEF framework. Similarly, when looking at education, a mother's education level seems to have an impact on the household FS levels on its own, but when adjusting for other variables and the HHs employment the HH have a bigger impact and these variables have more explanatory value. It also seems that employment status can have more effect on the FS, especially for those households where the HH is unemployed.

Other included variables

The other variables included in the regression models where number of children in the household, the age of the mother and the household size. All of these where included as continuous variables, unlike what is shown in the characteristic (table 3), where they are grouped. The age of the mother (18-49) is only significant for SFI in the first model and for both in model 3. This means that with age the odds of FI and SFI increases as well. The OR is low, only slightly above 1, but goes over the whole span from 18-49, and can therefore have a noticeable effect over time. This might be explained by how it can become increasingly harder to get employed with age, both for the mothers and men in the household, and that the younger mothers seem to be more educated as the enrolment increases, which is also correlated with finding work. For the male caretakers the increasing age might also make it more difficult to find work, explaining why the age of the mother becomes significant in the third model, when adjusted for the HH.

Household size is not related to FI in this analysis. There was no significant for the chi-square test or in any of the regression models, where the OR was around 1 for both FI and SFI, meaning that there is no change in the odds of FI/SFI with increased household members. In SSPR they found that household size on average was higher in FI household, different from this analysis (Chaaban et al., 2015). Like this analysis the findings in SSPR were not significant, and most probable the difference is caused by differences in models and included variables. The fact that household size and FI/SFI is not related in this analysis is most probably because even if more people to feed might cause FS to decrease, more people also means the household can have higher income, more people to cook and care for each other and overall decrease the odds of FI/SFI.

The final variable is the number of children in the household. This was significant for FI, but not for SFI in all models. This indicates that more children increase the odds of some degree of both FI and SFI, but not significantly for SFI. This could be like the household size, where the number of people to feed would increase the odds of FI, but children will also contribute to the household in some ways, which might lessen the odds of SFI. In this population it is not uncommon for children to work with smaller jobs in order to help their families. These findings are similar to what found in SSPR, where 40% of children live in MFI households, and FS households have fewer children. This distribution explains why this variable is significant for FI, where MFI is part of the FI group, but not SFI where MFI is part of the FS/non-severe FI group.

External variables

There are many variables in any population that influences their FS, and in this analysis only a few are included to see how they influence FS in this specific population. Other variables that can influence FS include the living conditions, resources, wages, job security, knowledge of food and nutrition and overall health. For PRL there are several things influencing their everyday life that can come in the way of FS, including access to education and work. The poor living conditions makes accessing nutritious food, and preparing them difficult, and the poverty in the population is also a big issue. They lack rights making it hard to improve the situation for them self and since there are so many refugees, not only PRL, in Lebanon, helping them is a hard task as well. Research has found that job stability and higher payment for parent makes it more likely that their children will do well in life when it comes to

education, employment and so on (Dahl et al., 2014; Næss et al., 2007). And as discussed this can also have a positive impact on their health, and long term for coming generations. More job stability among PRL would most likely be positive for the children, but it would also help parents, create less stress and most likely be positive for their mental health and create positive consequences overall. All these things make it important to find cost-effective solutions that can help with more than one problem at a time and that creates long-term progress for the population.

The basic causes of malnutrition leading to FI from the UNICEF framework include "sociocultural, economic and political context", aspects that apply here, in addition to the "unhealthy household environment". The basic definition of refugees also includes added fear and loss of property, which can amplify the difficulties of their situation. This is connected to the variables mentioned above and those included in the analysis, and again highlight the complexity of the problem, and why the PRL population still have poor living conditions and problems with food and health 70 years after they arrived in Lebanon.

Limitations and strengths of the study

Advantages and limitations of secondary data:

There are many advantages of using secondary data, but also some disadvantages and considerations to keep in mind (Oxbridge Essays, 2017). Some of the major advantages include that it requires less time and money and can assure a bigger data set for a thesis than one could collect in the time available. In this case that meant an opportunity to use the funds available to visit the refugee population and the researchers to get a better understanding of both the context and the project itself, which is a very valuable possibility when using secondary data.

Two of the common disadvantages of using secondary data is that the data collection was not done with the specific research question of the thesis in mind, and that the data may lack details needed for the analysis (Oxbridge Essays, 2017). The first point is relevant in this case, but since the original aim of the data collection was to get a broad overview of the situation the data set had a lot of information that can be used to answer a lot of questions – including those posed in this thesis. The questions were developed while reading the SSPR and adjusted somewhat to fit the available data when getting access to it. The only drawback when it came

to details was that there was no information on who were mothers in the population, which made the definition of mothers less clear than one could have wanted.

A final possible disadvantage is the lack of control over the quality and process of data collection (Oxbridge Essays, 2017). For this project we were given access to the entire data set, the questionnaire used and had contact with several of the researchers from the project and authors of the SSPR throughout the project, which made it possible to get extra information on the data collection, the data itself, all the details needed, in addition to much help with the analysis to ensure that everything was understood correctly and done properly. The researchers and data collectors were professionally trained and experienced, and the validity of the methods were ensured, making this set of secondary data both robust, quality assured and validated (Chaaban et al., 2015; Thesis Hub, n.d.).

Other limitations

One of the limitations of this study is that the household income is not included in the analysis. This is a variable that will have an impact on the FS, which is showed in the SSPR; poor households are much more likely to be SFI (Chaaban et al., 2015). This was not included because the data on this would need a lot of work to be used in the analysis and the other variables were more important for the study. Additionally, the analysis had to be limited in order to be manageable for this thesis. Other variables we know from SSPR influence household FS could also have been included but were also excluded because of time and having to limit the analysis.

Another limitation is that there is a risk of multicollinearity between the characteristics of mothers and HH, which has not been tested. This was not done because of the limited knowledge and experience with Stata and statistical analysis before the project and a lack of time to attain this knowledge and perform the tests. This lack of knowledge is a drawback here, but also part of doing a thesis and a part of the learning experience it contains. Multicollinearity would mean that there is a correlation between variables in the regression model which are supposed to be independent of each other (Frost, n.d.). In this case this would be the employment and education levels of mothers and HH, which might correlate. The analysis shows that the third model makes some significant values non-significant, which can be a sign of multicollinearity. But the changes in OR and CI are small which indicates that it might just be adjusted by added variables, and not multicollinearity (Statistics

Solutions, n.d.). This could influence model 3 but would not affect the model and its significance, and model 1 and 2 does not have the same risk.

Additionally, a final limitation is that mothers were not defined in this data, which is mentioned above. This meant that a lot of time was spent defining a variable for the mothers. This variable might not cover everyone and might have excluded participants that should be included when trying to make it as precise as possible.

Strengths of our study

A key strength of this study is the sample size of the original population. Having this amount of data has made a big difference and would not been possible to collect in the time available. Additionally, having access to the camps the data was collected from and the researchers working of the project have been a big help to understand the situation more, to get answers to all the questions that came up during the project and be able to get additional information about the project and the context the PRL population live in. Using secondary data was for this project a strength because of these reasons, in addition to the quality of the data and other aspects discussed above.

Conclusions and outlook

This study aimed to explore the relationship between maternal education and employment, and the household food security levels among Palestine refugees in Lebanon. The results show that among mothers only 34.01% of PRL are food secure. It also showed that increased education among mothers decreases the odds of FI/SFI, and that there is a significant decrease in odds of SFI for mothers with Brevet and higher education. This link is also present for HH, but for them Brevet and higher education decreases the odds of both FI and SFI significantly. For both groups those who are unemployed have much higher odds of being both FI and SFI. There also seemed to be a connection between higher education and being employed, indicating a connection between the socioeconomic aspects like what is present in higher income countries. These finding are supported by existing literature which also shows how big the consequences of these issues can be and underlines the need for addressing them.

This study also highlights some of the complexity of the situation and how it needs dealing with from several angles at once to make a lasting change. Focusing on enrollment in and access to education for everyone while creating jobs to increase employment for both HH and

mothers could be wise as these factors can have a significant effect on the problem and can be a way to improve the vicious circle food insecurity and poor nutrition can be a part of. Teaching mothers about nutrition and improving the housing conditions for the population could also be a way of helping, in addition to other aspects mentioned in the UNICEF framework. In order to gain more information on this topic more research should be taken on by others, by examining the relationship between mothers' education and employment, and household food security further. To create a clearer picture on the causes of FS other variables, like income, should be included in further research. This could help more with the future work and to generate more of the information needed. In addition, more funding is needed to make sustainable change, and securing this is an important part of future endeavors to be able to make further investments in the population's health, education and living conditions. Some aspects have improved since 2010 but there is still need of both more knowledge and increased efforts to make the situation better for the PRL population.

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Appendices

Appendix 1

The target PRL sample size was calculated to be 2816 households using the following formula:

$$n = \frac{4\,(r)\,(1-r)\,f\,(1.15)}{[\,(0.1r)^2\,p\,(n_h)\,]}$$

Where

N	The sample size expressed as the number of households = 2816 HH
4	Factor necessary to achieve 95% confidence level
R	The predicted or anticipated prevalence (coverage rate) of the selected indicator which is the Wealth Index = 21.40%[182]
1.15	Factor necessary to increase the sample size by 15% for non-response
F	Shortened symbol for deff (sample design), assumed = 1.5
0.1r	The margin of error at 95% confidence level, and is defined as 10% of r (10% sampling error relative to the estimate r)
P	Proportion of the poorest population relative to the total population (poorest quintile) = 20%
n_h	Average household size = 4.5

Figure 4: *Sample calculation from SSPR, calculation the number of households needed for the survey.*

Appendix 2

Education categories	Food insecurity			Education categories	Severe food insecurity		
	Not food	Food ins	Total		Non-seve	Severely	Total
No educa	19.59	80.41	100	No educa	55.4	44.6	100
Elementa	23.28	76.72	100	Elementa	62.94	37.06	100
Preparat	29.49	70.51	100	Preparat	71.73	28.27	100
Brevet a	46.14	53.86	100	Brevet a	83.56	16.44	100
Total	33.99	66.01	100	Total	73.66	26.34	100

Table 1: *Tabulations of FI and SFI with education level for mothers. Both had p-values = 0.0000.*

Education categories HH head	Food insecurity			Education categories HH head	Severe food insecurity		
	Not food	Food ins	Total		Non-seve	Severely	Total
No educa	29.25	70.75	100	No educa	68.18	31.82	100
Elementa	32.38	67.62	100	Elementa	72.89	27.11	100
Preparat	35.36	64.64	100	Preparat	76.19	23.81	100
Brevet a	49.77	50.23	100	Brevet a	82.24	17.76	100
Total	37.54	62.46	100	Total	75.67	24.33	100

Table 2: *Tabulations of FI and SFI with education level for the heads of households. Both had p-values = 0.0000.*

Appendix 3

	Food secure	Mild to moderate food insecure	Severely food insecure	Total
Employment status				
Employed	3.25%	2.94%	1.62%	**7.81%**
Unemployed	1.29%	1.73%	2.73%	**5.75%**
Not working, is a housewife	26.64%	31.8%	19.68%	**78.13%**
Not working, other reason	2.77%	3.23%	2.31%	**8.31%**
Education				
None	0.56%	1.03%	1.34%	**2,99%**
Elementary	5.27%	8.98%	8.39%	**22.63%**
Preparatory	11.07%	15.76%	10.55%	**37.39%**
Brevet and higher	17.08%	13.9%	6.00%	**36.98%**
Children				
1-3	30.64%	33.48%	22.64%	**86.76%**
4-7	3.37%	6.19%	3.67%	**13.24%**
Age groups				
18-29	10.46%	12.01%	5.59%	**28.08%**
30-39	12.98%	14.85%	10.67%	**38.51%**
40-49	10.56%	12.82%	10.04%	**33.42%**
Food security	**34.01%**	**39.68%**	**26.31%**	

Table 3: *Characteristics of mothers in the population. Percentages for each category (employment, education, number of children and food security), calculated with samplings weights.*

Appendix 4

Tables with parts of the regression results from the three different models. Only included the odds ratio and p-values for each variable and for each model. Statistically significant values at a 0,05 level are marked with a star (*).

	FI		SFI	
	Odds ratio (95% CI)	p-value	Odds ratio (95% CI)	p-value
Education mother				
Elementary	0.79 (0.28, 2.21)	0.656	0.74 (0.29, 1.86)	0.523
Preparatory	0.58 (0.22, 1.50)	0.257	0.49 (0.21, 1.15)	0.102
Brevet and higher	0.29 (0.10, 0.82)	*0.020	0.24 (0.09, 0.59)	*0.002
Employment mother				
Unemployed	2.48 (1.16, 5.28)	*0.019	3.86 (1.88 7.95)	*0.000
Not working, housewife	1.08 (0.65, 1.78)	0.766	1.08 (0.63, 1.87)	0.775
Not working, other reason	1.20 (0.64, 2.25)	0.564	1.28 (0.58, 2.83)	0.535
Age mother	1.01 (0.99, 1.03)	0.089	1.02 (1.00, 1.04)	*0.029
Number of children	1.15 (1.03, 1.27)	*0.009	1.07 (0.94, 1.21)	0.291
P-value for model		***0.0000**		***0.0000**

Table 4: Regression model 1

	FI		SFI	
	Odds ratio (95% CI)	p-value	Odds ratio (95% CI)	p-value
Education HH				
Elementary	0.76 (0.37, 1.53)	0.434	0.47 (0.20, 1.09)	0.080
Preparatory	0.61 (0.29, 1,30)	0.198	0.40 (0.18, 0.90)	*0.027
Brevet and higher	0.31 (0.15, 0.62)	*0.001	0.24 (0.11, 0.52)	*0.000
Employment HH				
Unemployed	2.49 (1.31, 4,72)	*0.006	3.21 (1.98, 5.19)	*0.000
Not working, housewife	0.84 (0.47, 1.50)	0.548	1.90 (0.91, 3.99)	0.089
Not working, other reason	1.39 (0.93, 2.09)	0.109	2.00 (1.27, 3.15)	*0.003
Household size	1.02 (0.93, 1.14)	0.634	1.07 (0.98, 1.18)	0.116
Number of children	1.15 (1.01, 1.31)	*0.032	1.04 (0.90, 1.19)	0.613
p-value for model		***0.0000**		***0.0000**

Table 5: Regression model 2

	FI		SFI	
	Odds ratio (95% CI)	**p-value**	**Odds ratio (95% CI)**	**p-value**
Education mother				
Elementary	0.85 (0.26, 2.75)	0.783	0.72 (0.27, 1.96)	0.519
Preparatory	0.69 (0.23, 2.07)	0.506	0.55 (0.21, 1.46)	0.230
Brevet and higher	0.44 (0.14, 1.43)	0.172	0.32 (0.12, 0.90)	*0.031
Employment mother				
Unemployed	1.83 (0.84, 4.01)	0.129	3.33 (1.57, 7.06)	*0.002
Not working, housewife	0.91 (0.52, 1.59)	0.747	1.16 (0.64, 2.11)	0.628
Not working, other reason	0.92 (0.48, 1.77)	0.798	1.16 (0.51, 2.64)	0.728
Education HH				
Elementary	0.89 (0.45, 1.77)	0.737	0.54 (0.25, 1.17)	0.119
Preparatory	0.75 (0.35, 1.61)	0.456	0.50 (0.24, 1.05)	0.068
Brevet and higher	0.42 (0.20, 0.86)	*0.019	0.35 (0.17, 0.72)	*0.005
Employment HH				
Unemployed	2.43 (1.27, 4.65)	*0.008	3.24 (1.99, 5.26)	*0.000
Not working, housewife	0.73 (0.39, 1.33)	0.302	1.70 (0.78, 3.73)	0.186
Not working, other reason	1.45 (0.95, 2.21)	0.086	2.04 (1.31, 3.17)	*0.002
Household size	0.96 (0.86, 1.08)	0.518	1.01 (0.92, 1.12)	0.785
Age mother	1.02 (1.00, 1.04)	*0.017	1.03 (1.99, 1.05)	*0.031
Number of children	1.20 (1.06, 1.36)	*0.005	1.08 (0.93, 1.24)	0.308
p-value for model		***0.0000**		***0.0000**

Table 6: Regression model 3