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on migration

Evaluation of the Malnutrition Status of Children Under Temporary Protection and Implementation Suggestions

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Evaluation of the Malnutrition Status of Children Under Temporary Protection and Implementation Suggestions

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Table of Abbreviations

FAO	Food and Agriculture Organization
TP	Temporary Protection
IOM	International Organization for Migration
PAPFAM	Pan Arab Project for Family Health
SED	Social Economic Assistance
SGDD/ASAM	Association for Solidarity with Asylum Seekers and Migrants
SPSS	Statistical Package for the Social Sciences
SUY	Social Cohesion Assistance
CCTE	Conditional Cash Transfer for Education
UNHCR	United Nations Refugee Agency
UNICEF	United Nations International Children's Fund
WFP	World Food Programme
WHO	World Health Organization

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1. Executive Summary

80% of the forcibly displaced people in the world are at risk of food insecurity and malnutrition (UNHCR, 2019).

Refugees and asylum-seekers have difficulties in reaching adequate and balanced foods in terms of protein, carbohydrate, fat, vitamins, and minerals.

Inadequate hygiene conditions such as lack of suitable storage conditions, difficulties in accessing clean water and hygiene materials cause food poisonings and gastrointestinal system diseases. Frequent infections increase the prevalence of malnutrition, especially in children.

Approximately 149 million children under the age of 5 are stunted, 49.5 million are underweight and 40.1 million are overweight in the world (Development Initiatives, 2020). On the other hand, Syrians under Temporary Protection (TP)[1] status in Turkey are at risk of food insecurity by 23% with an increase of 5% compared to 2018 (FSIN and Global Network Against Food Crises, 2020).

Inadequate socio-economic conditions increase the risk of malnutrition among children (Development Initiatives, 2020). Refugee and asylum seeker children, one of the most vulnerable groups in society, are at risk of suffering from malnutrition because of the lack of access to livelihoods, inadequate accommodation conditions, the lack of access to clean water, inability to access adequate and balanced food, crowded population of household and separation of the child from a caregiver for several reasons.

Malnutrition increases the risk of chronic illnesses and death among children (WHO, 2010 & FAO, IFAD, UNICEF, WFP and WHO 2020)

While malnutrition affects mental development (WHO, 2010) and height-for-age negatively in childhood (World Bank, 2020, cited in FAO, IFAD, UNICEF, WFP and WHO, 2020); it increases the risk of disability and diseases in adulthood (FAO, IFAD, UNICEF, WFP and WHO,2020 & WHO, 2010).

Children who are severely malnourished are at higher risk of death than other children (WHO, 2010). Wasting (low weight-for-height), one of the forms of malnutrition, prevents the immune

[1]Temporary protection may be provided for foreigners who have been forced to leave their country, cannot return to the country that they have left, and have arrived at or crossed the borders of Turkey in a mass influx situation seeking immediate and temporary protection (Directorate General of Migration Management).

- 1 out of every 6 children included in the study is stunted, in other words, short for their age.

- 1 out of every 13 children included in the study is underweight, in other words, thin for their age.

- 1 out of every 21 children included in the study is overweight.

- 1 out of every 27 children included in the study is wasted, in other words, thin for their height.

system from working properly and causes progression in existing diseases which may increase the risk of death (WHO, 2010).

When serious effects of malnutrition on children are evaluated; refugee and asylum seeker children, one of the vulnerable groups, are at risk of facing serious medical conditions.

In the light of the data, the malnutrition status of Syrian children under TP in Turkey, the country with the most refugee and asylum seeker population, was evaluated in this study. Four malnutrition forms including wasting, stunting, underweight and overweight are included in this study. The prevalence of these malnutrition forms and their relations with gender, disability, medical condition, and household income levels have been tried to reveal. With the intent of evaluating public health risk levels of childhood malnutrition, the results of this study were compared with international reports published in the same field. Based on the results of this study, further suggestions aiming at reducing the risk of malnutrition among asylum seeker children in Turkey were presented.

817 Syrian children who received service from ASAM between 2019-2020 were included in the study.

- 254 (31.1%) children from Adana, 111 (13.6%) from Ankara, 123 (15.1%) from Gaziantep, 166 (20.3%) from Istanbul, and 163 from Izmir (19.9) were included in this study.
- The study includes 410 (50.2%) boys and 407 (49.8%) girls.
- No statistically significant difference was found between gender and stunting, wasting, underweight and overweight.
- 227 (27.8%) children have at least one form of disease and/or disability, 590 (72.2%) children do not have any form of disease and/or disability.
- The prevalence of stunting and underweight in children with at least one form of disease and/or disability was found higher. On the other hand, no significant difference was not found between disease and/or disability and overweight and wasting.
- The prevalence of wasting and stunting in children whose household income levels are above 2000 TL is higher than children whose household income levels are between 1501-2000 TL.

- **1 out of every 6 children included in the study is stunted, in other words, short for their age.**

According to the findings of this research, stunting, an indicator of chronic malnutrition, is seen to be a risk regarding public health. Stunted children are at risk of a reduction in intelligence level, mental insufficiency, and decrease in academic performance. According to this study, the number of stunted Syrian children is higher compared to the normal standard distribution of stunted children in society. 11 studies that were conducted with Syrian asylum seeker children in Turkey, Egypt, Jordan, Lebanon, and Iraq and with Syrian children in Syria support the findings of this study that shows the worrying results of stunting.

- **1 out of every 13 children included in the study is underweight, in other words, thin for their age.**

This means that these underweight children are at higher risk of death because of the diseases such as diarrhea, food poisoning, and upper respiratory infections. Additionally, according to the findings of the research, the number of underweight Syrian children is higher compared to the normal standard distribution of underweight children in society.

- **1 out of every 21 children included in the study is overweight.**

This means that these overweight children are at higher risk of death due to non-communicable diseases such as obesity, diabetes, cardiovascular diseases, and cancer. According to our findings, the number of overweight Syrian children is higher compared to the normal standard distribution of overweight children in society. 8 studies that were conducted with Syrian refugee and asylum seeker children in Turkey, Egypt, Jordan, Lebanon, Greece, and Iraq and with Syrian children in Syria support the findings of this study that shows the worrying results of overweight.

- **1 out of every 27 children included in the study is wasted, in other words, thin for their height.**

According to the findings, the number of wasted Syrian children is similar to the normal standard distribution of wasted children in society. Other than this study, 4 studies that were conducted in Lebanon, Iraq, and Egypt with Syrian refugee children and in Syria with Syrian children show the worrying results of wasting. Wasted children who are unable to reach for proper treatment are at a higher risk of death than other children. This means that wasted children require emergency nutrition therapies by health institutions.

SUGGESTIONS

In the light of the findings of this study, the following suggestions can be made for reducing the risk of malnutrition:

- Providing necessary training about adolescent pregnancy, frequent pregnancy, and family planning.
- Carrying out awareness-raising activities about adequate and balanced nutrition during pregnancy and lactation, the importance of breastfeeding, breastfeeding techniques, and complementary feeding.
- Carrying out supportive individual and group activities for minimizing the psychological factors such as anxiety disorders which may affect the breastmilk and nutrition status of the mother.
- Carrying out regular screenings about weight, vitamin supplementation, nutrition practices, and complications about nutrition in pregnant women and mothers; taking necessary actions within this framework.
- Carrying out informative and awareness-raising activities for caregivers about micronutrient (vitamin and minerals) deficiencies in children, clinical symptoms of these deficiencies, and the groups who are at risk of micronutrient deficiencies. Organizing informative and

awareness-raising activities and seminars periodically; increasing the collaboration with all local and international institutions in order to increase the project implementations.

- Carrying out awareness-raising activities for caregivers and children about good hygiene practices and increasing the supports for basic hygiene needs.
- Systematically evaluating and monitoring the changing conditions depending on the course of the pandemic by conducting regular field research and allocating additional financial resources for regular monitoring and reporting with relevant partners.
- Developing additional policies and implementations for children who are under the risk of malnutrition and for their families; establishing possible and new collaborations for making additional financial resources while maintaining the existing collaborations and policies.

2. Introduction

The Syrian crisis is now in its 10th year and it continues to affect millions of people negatively. Turkey is the country hosting the highest number of refugees and asylum seekers in the world with a population of approximately 4 million Syrians under TP. 13.7% of this population (501.349) consists of children aged between 0-4 years (UNHCR, 2021).

Children are one of the most vulnerable groups in times of crisis and conflict. Especially, insufficient income, difficulty in accessing healthy food, crowded household population or separation of the child from a caregiver for some reason cause an increase in the prevalence of malnutrition in children.

According to 2020 Global Nutrition Report; **149 million children under the age of 5 are stunted (21.9%), 49.5 million are underweight (7.3%) and 40.1 million are overweight (5.9%).** It is observed that malnutrition forms such as stunting, underweight and overweight are associated with household income, area of residence, and level of education. While the number of stunted and underweight children is higher in households with low- or middle-income, overweight children are more common in households with high-income. The prevalence of stunted children in low-income households is 43.6%, whereas it is 18.6% in high-income households (Development Initiatives, 2020). Stunting and underweight are more common in children living in rural areas and raised in households with low education levels. In contrast, overweight is more common in children living in urban areas and raised in households with higher levels of education (Development Initiatives, 2020).

On the other side, 1% of the world's population, in other words, 79.5 million people, is displaced. 40% of this 79.5 million people are children. The numbers show that forcibly displaced people have doubled since 2010. 80% of the displaced people face the risk of food insecurity and malnutrition (UNHCR, 2019). Asylum seekers may not have access to food that will support their development in terms of

macro- (protein, carbohydrate, and fat) and micro- (vitamin and minerals) nutrients. Inadequate hygiene conditions in terms of production, storage, and consumption of the foods reached cause food poisoning or diseases such as intestinal worms and affect children's development negatively. Especially, resistant infections increase the prevalence of stunting and wasting.

According to WFP (2020), in 55 countries and regions, 135 million people surveyed in total face food insecurity and 17 million children under the age of 5 suffer from acute malnutrition and 75 million children suffer from chronic malnutrition (**FSIN and Global Network Against Food Crises, 2020**).

According to a study conducted by WFP (2020) in 2019, Syrians in Turkey under TP status face food insecurity at 23% with an increase of 5% compared to 2018 (**FSIN and Global Network Against Food Crises, 2020**).

According to nutritional studies conducted in Syria in 2018, acute malnutrition affects 91.800 children, which is within acceptable limits. It is estimated that 865.300 children have micronutrient (vitamin and minerals) deficiencies. Regarding chronic malnutrition, it is still a worrying problem as it was before the Syria crisis in 2011. **In the post-crisis term, 30% of the children between 0-59 months are suffering from chronic malnutrition (FSIN and Global Network Against Food Crises, 2020).** Likewise, studies about infant nutrition conducted in Syria also reveal worrying results. **Only 24% of infants under 6 months are exclusively breastfed.** Moreover, in the northwest area of Syria, it is estimated that this rate decreases to 10% (**FSIN and Global Network Against Food Crises, 2020**). Inadequate nutrition of infants from the birth in mother's womb until the end of 2 years and most importantly not exclusively breastfeeding in the first 6 months cause chronic malnutrition in children. Considering these rates, it is predictable that chronic malnutrition reaches alarming levels among Syrian children.

In the light of these data, it is revealed that various forms of malnutrition develop in asylum seeker children who are at risk of food insecurity. Therefore, it becomes important to evaluate the prevalence of malnutrition in Syrian children under TP status in Turkey and develop strategies to decrease the risk of malnutrition.

3. About Research

3.1 Aim of the Research

This research aims to evaluate the malnutrition status of Syrian children under TP status in Turkey aged between 6-59 months in the forms of stunting, wasting, undernutrition, and overnutrition, and offer implementation recommendations to service providers to reduce malnutrition among children.

3.2 Definitions

Definitions about the forms of malnutrition regarding this research are shown below:

Underweight: If the standard deviation of weight-for-age is under -2, the situation is defined as underweight. Underweight is determined by measuring the children's weight and evaluating this measurement using international standards according to their ages. Underweight can be an indicator of both acute and chronic malnutrition. Moderately underweight children have higher risk of death than other children. Mortality rates are even higher for severely underweight children (WHO, 2010).

Stunting / Chronic Malnutrition: If the standard deviation of height-for-age is under -2, the situation is defined as stunting/chronic malnutrition. Stunting, in other words, shortness for age, is determined by measuring children's height and evaluating this measurement using international standards according to their ages. Stunting, also known as chronic malnutrition, is a result of not reaching healthy food for a long time. It is responsible for delayed mental development, decrease in academic performance and intelligence level (WHO, 2010).

Wasting / Acute Malnutrition: The situation is defined as wasting if the standard deviation of weight-for-height is under -2. Wasting, in other words, a weakness for height, is determined by measuring children's height and weight and evaluating these

measurements using international standards regardless of their ages. Wasting, which is an indicator of acute malnutrition, prevents the immune system from functioning properly, causes the progression of existing diseases, and consequently increases the risk of death in children (WHO, 2010). Acute malnutrition is a form of malnutrition that needs to be treated immediately.

Overweight: It is defined as overweight if the standard deviation of weight-for-height is above 2. Overweight is determined by measuring the height and weight of children and evaluating these measurements using international standards regardless of their ages. Overweight in childhood often ends up with overweight in adulthood. This can cause several types of disabilities, non-communicable diseases such as diabetes or cardiovascular diseases (WHO, 2010).

3.3 Methodology

3.3.1 Research Hypotheses

Research hypotheses are shown as below:

- Stunting, an indicator of chronic malnutrition, which is determined by calculating height-for-age standard deviations, in Syrian children between 6-59 months is observed more frequently than other forms of malnutrition.
- There is no statistically significant difference between gender and malnutrition.
- Household income levels affect the prevalence of malnutrition.
- There is a positive relationship between the medical condition and/or disability and malnutrition.

3.3.2. Research Model

General screening model was used in the study. General screening model is the analysis of the sample to reach a general judgement about the population. Both two approaches of the general screening model, singular screening and relational screening, were used in the study. Within the singular screening model, frequency tables were created regarding the malnutrition status of Syrian children between 6-59 months, and within the relational screening model, relations between malnutrition status of children and gender, income level, and disease and/or disability status were evaluated.

3.3.3. Population and Sample

The population of the study consists of 3003 children aged 6-59 months who benefited from the ASAM in 2019-2020. The sample of the study consists of 817 children who were chosen randomly from this population. The sample size that represents the population is determined as 384 children in minimum, according to power analysis about sampling, and this number was kept higher in order to increase the reliability of the research.

The research consists of 817 children who benefited from the ASAM and they are from 5 cities which are Adana, Ankara, Gaziantep, İstanbul, and İzmir. Sample size determination was carried out according to the asylum seeker intensity of the cities. Children between 6-59 months were included in this study as the evaluation of malnutrition in children often starts after the age of 6 months and as malnutrition is one of the most important reasons for high mortality rates under the age of 5 in children

3.3.4. Data Collection Tools and Time

Quantitative data collection method was used since the research is a cross-sectional study, and document scanning was done regarding the subject. Cross-sectional studies are mostly carried out for public health planning and they reveal the prevalence of the outcome of the specified population. Data can also be collected about individual characteristics including exposure to risk factors. In short, cross-sectional studies can be called snapshots of the outcome at a given time and situations associated with it (Levin, 2006).

Anthropometric measurements (weight and height measurements) taken from Syrian children between 6-59 months who received services from the ASAM and demographic data which were obtained from the first-degree caregivers during the counselling with caregivers were included in this research.

Anthropometric measurements were taken by nutrition specialists who are experts in this field.

- Anthropometric measurements of children under the age of 2 were taken in the recumbent position and they were taken for children older than 2 years in standing position.
- The weight and height measurements of the children under the age of 2 years were taken by the baby scale and infantometer in the recumbent position. Only light clothing remained during the measurement and shoes were removed. The baby scale has a capacity of 20 kilograms, and it measures every 5 grams until 10 kilograms and every 10 grams after 10 kilograms.

Infantometer has a capacity of 30-80 centimeters and is 1 millimeter apart.

- The weight and height measurements of children over the age of 2 years were taken in a standing position with a body scale that measures between 2-200 kilograms and a stadiometer that measures between 70-190 centimeters. Weight measurement was taken with only light clothing on and height measurement was taken without shoes, in accordance with the head straight Frankfort horizontal plane. The sensitivity was 100 grams for the body scale and 0.5 centimeters for the stadiometer.

3.3.5. Limitations

Limitations of the research are shown as below:

- The study is limited to cities of Adana, Ankara, Gaziantep, Istanbul and Izmir.
- Children with disabilities and metabolic diseases who are at risk of malnutrition could not apply to the ASAM offices because of their difficulties with going outside, and they had to be excluded from the study as their anthropometric measurements could not have been taken.
- For some children, there are differences between the actual date of birth and the date of birth that is written on IDs provided under TP.

3.3.6. Data Analysis

Within the context of the study, the relationships between the forms of malnutrition consisting of stunting, wasting, undernutrition, and overnutrition in children and factors such as gender, medical condition and/or disability situation, and income levels of the household were examined. The results concerning the prevalence of malnutrition for children that were obtained from the research were evaluated by comparing them with international reports in this field.

Analyses were performed by Statistical Package for the Social Sciences (SPSS) program. Frequency tables and crosstabs were used for inferential statistics results. The independent-samples t-test and one-way ANOVA were implemented for the statistics of the relations between variables. A p-value of <0.05 was considered statistically significant.

Anthro v3.2.2 prepared by WHO was used for calculating the z scores of weight-for-age, height-for-age, and weight-for-height. Anthro v3.2.2 was launched in January 2011 and it is a program that includes an anthropometric calculator, individual assessment, and nutritional survey.

4. Results

4.1 Demographic Data of the Children

254 (31,1%) children from Adana, 111 (13,6%) from Ankara, 123 (15,1%) from Gaziantep, 166 (20,3%) from Istanbul and 163 (19,9%) from Izmir were included to the study (Figure 1).

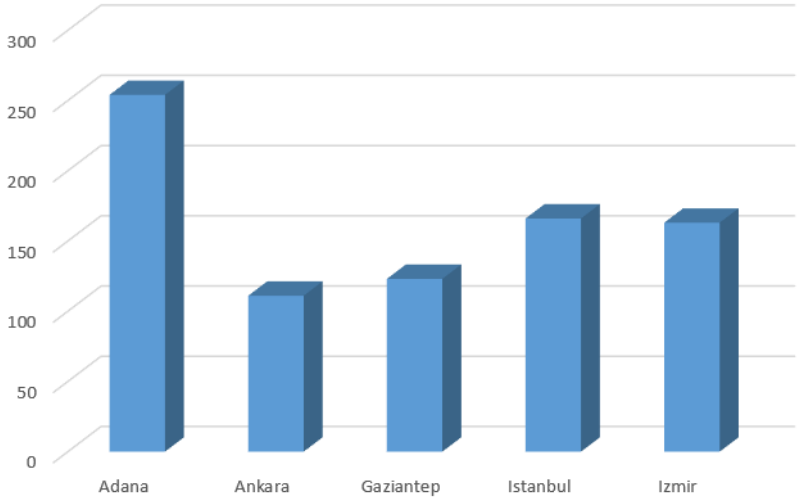

Figure 1. Distribution of children by cities

A total of 817 children including 410 boys (50.2%) and 407 girls (49.8%) were included in the study (Figure 2).

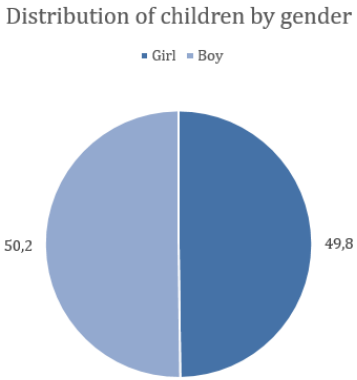

Figure 2. Distribution of children by gender

When all diseases diagnosed in children other than malnutrition and all forms of disabilities including visual, speech impairments, physical and mental disabilities are examined it has been observed that 227 (27.8%) - children have at least one form of disease and/or disability, 590 (72.2%) children do not have any form of diseases and/or disabilities (Figure 3).

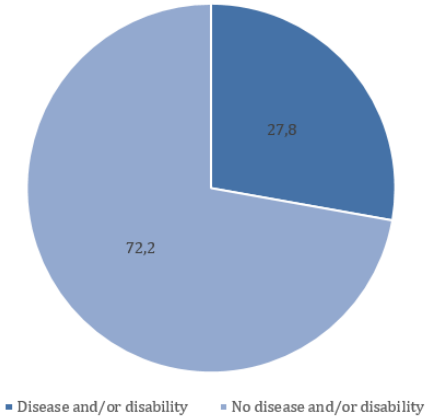

Figure 3. Distribution of children by the presence of disease and/or disability

144 children included in the study are 6-11 months (17.6%), 191 children are 12-23 months (23.4%), 181 children are 24-35 months (22.1%), 164 children are between 36-47 months (20.1%), and 137 children are between 48-59 months (16.8%) (Figure 4).

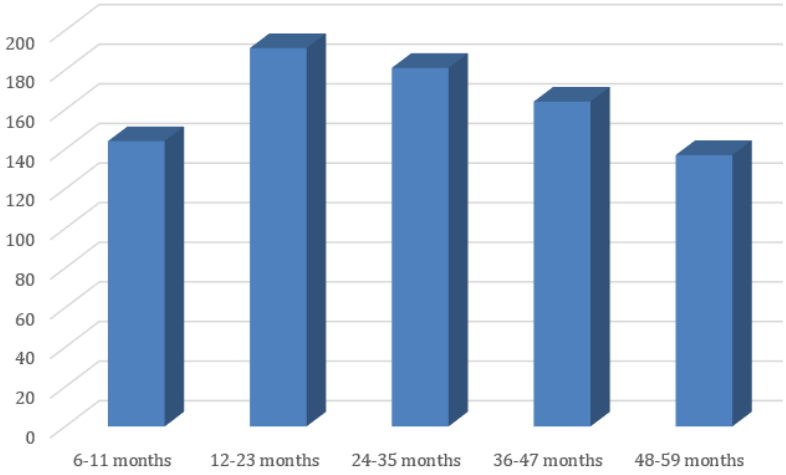

Figure 4. Distribution of children by their age (month)

Table 1 shows the sample characteristics.

Table 1. Sample characteristics (Age, gender, residence, presence of disease/disability)

	Number of Children	Proportion of Sample (%)
Age (Month)		
6-11	144	17,6
12-23	191	23,4
24-35	181	22,1
36-47	164	20,1
48-59	137	16,8
Total	**817**	**100**
Gender		
Girl	407	49,8
Boy	410	50,2
Total	**817**	**100**
Residence		
Adana	254	31,1
Ankara	111	13,6
Gaziantep	123	15,1
İstanbul	166	20,3
İzmir	163	19,9
Total	**817**	**100**
Presence of Disease/Disability		
Yes	227	27,8
No	590	72,2
Total	**817**	**100**

4.2 Demographic Data of the Parents

In this section, demographic data of the parents of children are presented.

When the income levels of the households are examined, it has been revealed that 134 (16.4%) people are with an income level of 0-500 TL, 161 are (19.7%) between 501-1000 TL, 167 (20.4%) are between 1001-1500 TL, 190 are (23.3%) between 1501-2000 TL and 165 are (20.2%) above 2000 TL (Figure 5). These income levels show the total income of the family and include monthly average income of the people in the household who work in regular or irregular jobs and social cohesion assistance (SUY), conditional cash transfer for education (CCTE), social and economic support (SED) and disability pension if they receive.

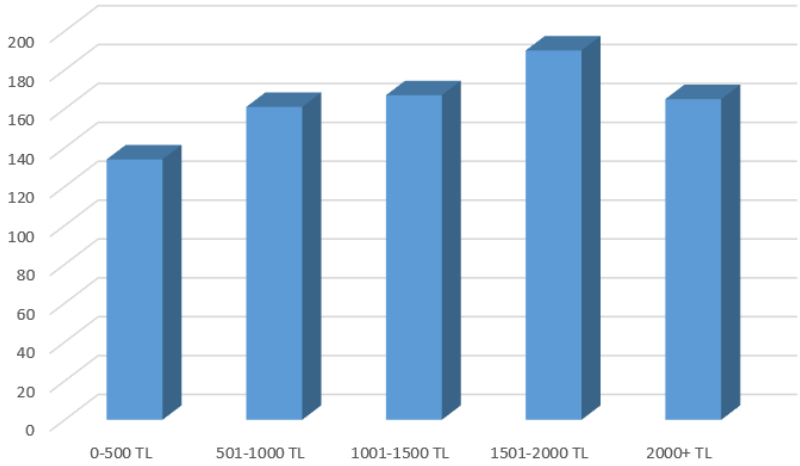

Figure 5. Distribution of household income levels

According to results, 296 (36.2%) of the caregivers have never been to school, 336 (41.1%) were graduated from primary school, 83 (10.2%) were graduated from secondary school, 74 (3.4%) were graduated from high school and 28 were graduated from college (Figure 6).

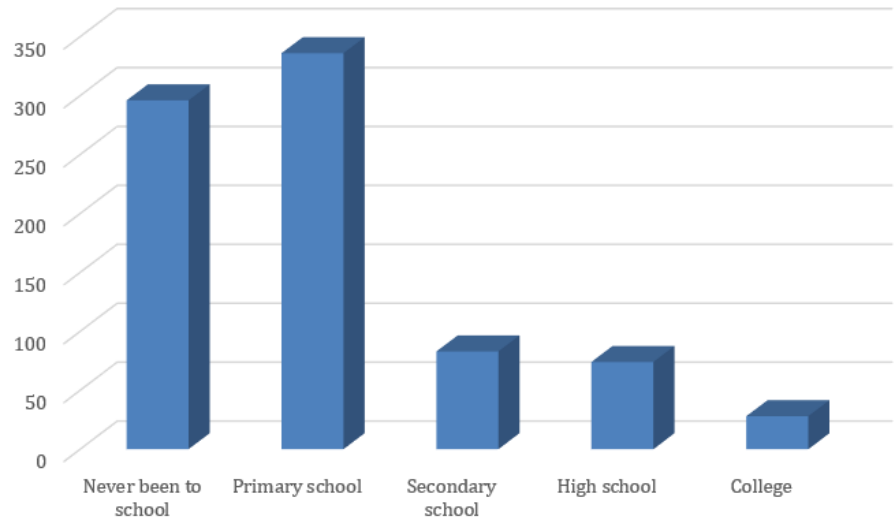

Figure 6. Education Levels of Caregivers

4.3 Results Regarding Malnutrition

Figure 7 shows the prevalence of malnutrition forms in the children included in this study. **Accordingly, 7.8% of the children are underweight, 3.8% are wasted, 17.5% are stunted and 4.8% are overweight.**

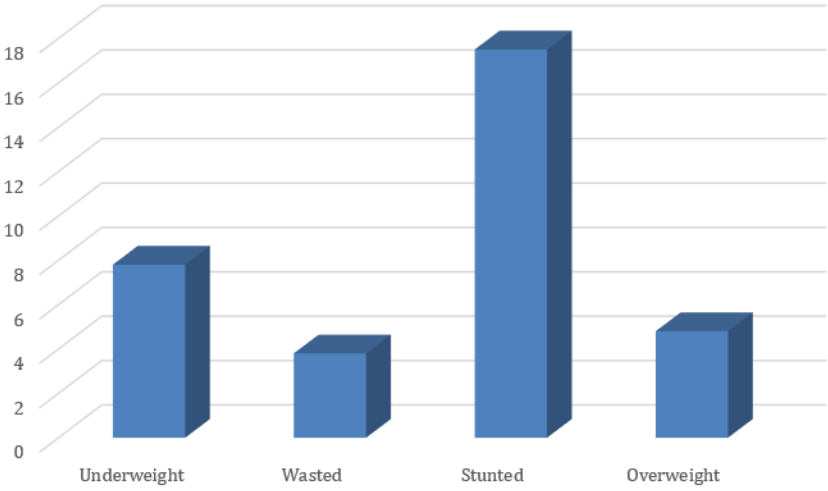

Figure 7. Prevalence of malnutrition forms in the whole sample (n=817) (%)

Table 2, on the other hand, shows the malnutrition prevalence by gender. As it is shown in Table 2, all forms of malnutrition except overweight are more common in boys than girls. Overweight is more common in girls (5.4%) than boys (4.1%)

Table 2. Malnutrition prevalence of Syrian children (n=817) between 6-59 months (%)

	Girl (n=407)	Boy (n=410)	Total (n=817)
Underweight	8,1	7,6	7,8
Wasted	3,4	4,2	3,8
Stunted	16,9	18,1	17,5
Overweight	5,4	4,1	4,8

Table 3 shows the results of the independent-samples t-test which were conducted to determine the difference between height-for-age, weight-for-age, weight-for-height z scores, and gender. A p-value of <0.05 was considered statistically significant. According to the analysis, no significant difference was found between malnutrition forms and gender.

Table 3. T-test results of the difference between height-for-age, weight-for-age and weight-for-height z-scores and gender (p <0.05)

	Sample	N	Mean	Standard Deviation	t	df	p
Height for Age	Girl	407	-0,8071	1,69683	-0,625	815	0,532
	Boy	410	-0,7323	1,72171			
Weight for Age	Girl	407	-0,2984	1,26075	0,131	815	0,896
	Boy	410	-0,3099	1,24663			
Weight for Height	Girl	407	0,1451	1,93591	-	815	0,855
	Boy	410	0,1654	1,15403	0,182		

Figure 8 shows the comparison graph of weight-for-age z scores and z score normal distribution curve. According to this graph, weight-for-age z scores determined in the sample are behind the normal distribution. Especially, weight-for-age standard deviations under -3 show severely underweight children and the graphic shows that the biggest difference between z scores obtained from the sample and normal distribution is between -2 and -3 standard deviation.

The graph obtained from the study is behind the normal standard distribution graph, and this means that Syrian children are behind the normal distribution in terms of underweight.

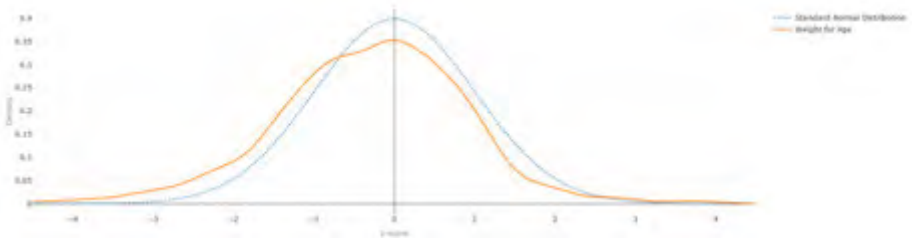

Figure 8. Comparison of the weight-for-age z scores (n=817) with z score normal standard distribution curve

Figure 9 shows the comparison of weight-for-height z scores and z score normal distribution curve. The graphic obtained from the study is located to the right of the normal standard distribution graphic. The reason for this situation stems from the fact that weight-for-height z scores which are above 2 are more common than weight-for-height z scores under -2. Overweight children are seen as more common in the sample than underweight children.

The graph obtained from the study is located to the right of the normal standard distribution graphic. This means that overweight Syrian children are above the normal distribution. This figure is an indication that overweight is more common than wasting in Syrian children included in the study.

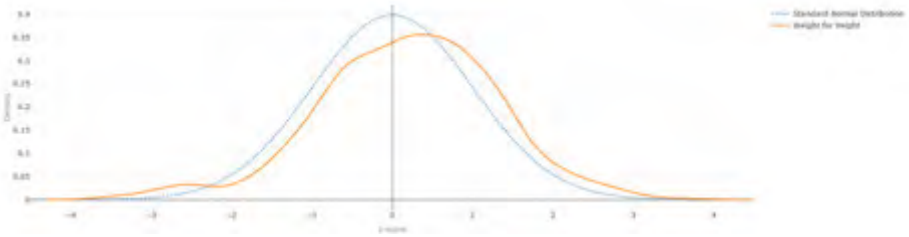

Figure 9. Comparison of the weight-for-height z scores (n=817) with z score normal standard distribution curve

Figure 10 shows the comparison of height-for-age z scores and z score normal distribution curve.

The graph about height-for-age z scores obtained from the study is located to the left of the normal standard distribution graph and this means that Syrian children are behind the normal distribution regarding stunting.

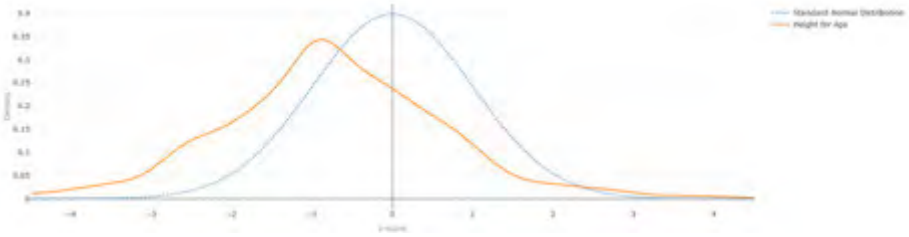

Figure 10. Comparison of the height-for-age z scores (n=817) with z score normal standard distribution curve

All tables from Table 4 to Table 10 show the data about the relationship between household income levels and height-for-age, weight-for-age, and weight-for-height z scores. While Table 4, Table 6, and Table 8 demonstrate descriptive statistics; Table 5, Table 7, and Table 9 demonstrate the significant relationship between household income levels and height-for-age, weight-for-age, and weight-for-height z scores.

Although one-way analysis of variance results (Table 5, Table 7, Table 9) show that there is no statistically significant difference between household income levels and z scores, descriptive statistics results based on averages are also remarkable. When descriptive statistics are examined (Table 4, Table 6, Table 8), as the household income levels increase, an improvement is observed in z scores of the anthropometric measurements. In contrast, all z scores of anthropometric measurements with income levels above 2000 TL are lower than z scores with income levels of 1501-2000 TL.

On the other hand, according to the anthropometric measurements (Table 4, Table 6, and Table 8) of the children in households with income levels above 2000 TL, the averages of the z scores are lower than the averages of children in the income levels of 2000 TL and below. Factors affecting the household income levels such as financial assistance and population of the household could not be assessed separately in the study.

Table 4. Evaluation of the difference between height-for-age z-scores and household income levels with one-way analysis of variance - descriptive statistics

Income Level (TL)	N	Mean (Height for Age Z Score)	Standard Deviation (Height for Age Z Score)
0-500	134	-1,0447	1,52297
501-1000	161	-0,9568	1,64280
1001-1500	167	-0,7466	1,75914
1501-2000	190	-0,5613	1,72163
2000+	165	-0,6263	1,81592

Table 5. Evaluation of the difference between height-for-age z-scores and household income levels with one-way analysis of variance – variance analysis (p<0,05)

	Sum of Squares	df	Mean Square	F	p
Between groups	27,508	4	6,877	2,371	0,051
Within groups	2354,990	812	2,900	-	-
Total	2382,498	816	-	-	-

Table 6. Evaluation of the difference between weight-for-age z-scores and household income levels with one-way analysis of variance - descriptive statistics

Income Level (TL)	N	Mean (Weight for Age Z Score)	Standard Deviation (Weight for Age Z Score)
0-500	134	-0,4975	1,30427
501-1000	161	-0,3476	1,27177
1001-1500	167	-0,2984	1,31924
1501-2000	190	-0,2007	1,16996
2000+	165	-0,2298	1,20990

Tablo 7. Evaluation of the difference between weight-for-age z-scores and household income levels with one-way analysis of variance – variance analysis (p<0,05)

	Sum of Squares	df	Mean Square	F	p
Between groups	8,264	4	2,066	1,318	0,261
Within groups	1272,715	812	1,567	-	-
Total	1280,979	816	-	-	-

Table 8. Evaluation of the difference between weight-for-height z-scores and household income levels with one-way analysis of variance - descriptive statistics

Income Level (TL)	N	Mean (Weight for Height Z Score)	Standard Deviation (Weight for Height Z Score)
0-500	134	0,1542	1,13520
501-1000	161	0,2077	1,20113
1001-1500	167	0,2180	1,20650
1501-2000	190	0,1766	1,05594
2000+	165	0,2130	1,03906

Table 9. Evaluation of the difference between weight-for-height z-scores and household income levels with one-way analysis of variance – variance analysis (p<0,05)

	Sum of Squares	df	Mean Square	F	p
Between groups	0,455	4	0,114	0,090	0,986
Within groups	1031,662	812	1,271	-	-
Total	1032,117	816	-	-	-

Table 10 demonstrates the results of the t-test performed to evaluate the levels of significance between z score values of anthropometric measurements and the presence of disease and/or disability. A p-value of <0.05 was considered statistically significant. A high level of significance was found between the presence of disease and/or disability and stunting or underweight. On the other hand, no significant difference was found between the presence of disease and/or disability and wasting or overweight.

Table 10. The t-test results of the difference between height for age, weight for age, and weight for height z-scores and disease and/or disability status (p <0.05)

	Presence of disease and/or disability	N	Mean	Standard Deviation	t	df	p
Height for Age	No	590	-0,6443	1,63185	3,209	815	0,001
	Yes	227	-1,0950	1,85864			
Weight for Age	No	590	-0,2226	1,16473	2,750	815	0,006
	Yes	227	-0,5164	1,43870			
Weight for Height	No	590	0,2135	1,06665	0,709	815	0,479
	Yes	227	0,1463	1,26430			

5. Discussion

In this study, the malnutrition status of Syrian children between 6-59 months who are under TP status in Turkey has been evaluated. The relationship between factors such as the gender, disease and/or disability of children, the income level of the household, and malnutrition forms including wasting, stunting, underweight and overweight were examined; and the results obtained in the study on the prevalence of malnutrition in children were evaluated by comparing them with international reports conducted in this field. In the light of the evaluation, implementation suggestions to reduce the risk of malnutrition for service providers have been presented.

When the malnutrition status of the 817 Syrian children who are included in this study is examined, it can be said that wasting prevalence, an indicator of acute malnutrition, is within acceptable limits (3.8%); and overweight is on the borderline of acceptable limits with the rate of 4.8%. On the other hand, the prevalence of stunting is on a moderate level with 17.5% and it poses a risk to public health

Approximately,

- 1 out of every 6 children included in this study is stunted.
- 1 out of every 13 children included in this study is underweight.
- 1 out of every 21 children included in this study is overweight.
- 1 out of every 27 children included in this study is wasted

When the normal standard distribution of underweight children in society is compared with Syrian children who are included in this study, it is seen that underweight Syrian children are more common in society.

When the normal standard distribution of overweight children in society is compared with Syrian children who are included in this study, it is observed that overweight Syrian children are more common in society. On the other hand, the prevalence of wasting in Syrian children is close to the normal standard distribution in society. It is observed that overweight children are more common than wasted children. Even though underweight and stunted children are more common in low- or middle-income households and overweight children

are more common in high-income households (Development Initiatives, 2020) in societies that have difficulties in accessing healthy foods and food variety, the basis of nutrition is mostly composed of fat, bread, sugary foods that might be associated with overweight. Nutrition higher in terms of fat and carbohydrate and lower in terms of vitamins and minerals can lead to overweight in long term. Besides, insufficient breastfeeding and complementary feeding in the early period pose a risk in terms of overweight in the future.

Compared to the normal standard distribution of stunted children in society with Syrian children who are included in this study, stunted Syrian children are more common in society.

The prevalence of underweight and stunting in children with disease and/or disability is higher than others. On the other hand, no significant difference was found between overweight or wasting and disease and/or disability presence.

No statistically significant difference was found between gender and malnutrition forms. However, all malnutrition forms except overnutrition are more common in boys than girls. On the other hand, overweight is more common in girls (5.4%) than boys (4.1%). As seen in Table 11, girls are in the medium-risk group and boys are in the low-risk group in terms of overweight.

Table 11. Prevalence thresholds, labels, and number of countries included in the study of wasting, overweight, and stunting in children under the age of 5 years

Wasting			Overweight			Stunting		
Prevalence Threshold (%)	Label	Number of Countries	Prevalence Threshold (%)	Label	Number of Countries	Prevalence Threshold (%)	Label	Number of Countries
<2,5	Very low	36	<2,5	Very low	18	<2,5	Very low	4
2,5-<5	Low	33	2,5-<5	Low	33	2,5-<10	Low	26
5-<10	Medium	39	5-<10	Medium	50	10-<20	Medium	30
10-<15	High	14	10-<15	High	18	20-<30	High	30
≥15	Very high	10	≥15	Very high	9	≥30	Very high	44

While assessing the situation about worsening outputs of height-for-age and weight-for-age z score averages of children between the households with 2000 TL and above income levels and the households with 1501-2000 TL income levels, social assistances increasing the income levels should be taken into consideration. It shows that awareness-raising activities should be made to prioritize the adequate and balanced nutrition of children in terms of macro and micronutrients suitable for their ages and their medical conditions and/or to support the households for accessing the food for families who cannot meet their basic needs in many respects. If this priority is not provided, no matter how high the income levels of the household are, this cannot affect children's malnutrition status positively.

To assess the results more comprehensively, the results of this study were compared with other studies that were conducted in this field. As seen in Table 12, 6[2] studies show very low, 6[3] studies low, 3 studies[4] medium and 1 study[5] shows a high level of wasting in Syrian children. One study which shows the high level of prevalence had been conducted in Syria before the 2011 Syria crisis (PAPFAM, 2009-2010, cited in UNICEF, 2016). As mentioned above, 6 studies including the study conducted by the ASAM show low levels of wasting prevalence. It is showed that wasting, an indicator of acute malnutrition, is not at worrying levels for asylum seeker children in 12 out of 16 studies.

11 studies out of 16 in Table 12 are about the evaluation of overweight in children. According to the results of these studies, in terms of overweight, 2 of them[6] are at a very low level, 1[7] is at a low level, 3[8] are at medium level, 4[9] are at a high level and 1[10] is a very high

[2]Lebanon (IOM) (Pernitez-Agan et al., 2019), Jordan (Hossain et al., 2016), Jordan (UNICEF), Jordan (UNHCR et al., 2019), Lebanon (Hossain et al., 2016), Turkey (Hacettepe University Institute of Population Studies, 2019).

[3]Turkey (ASAM), Jordan (IOM) (Pernitez-Agan et al., 2019), Turkey (IOM) (Pernitez-Agan et al., 2019), Greece (IOM) (Pernitez-Agan et al., 2019), Iraq (Hossain et al., 2016), Greece (Grammatikopoulou et al., 2018).

[4]Egypt (IOM) (Pernitez-Agan et al., 2019), Iraq (IOM) (Pernitez-Agan et al., 2019), Lebanon (UNICEF, 2013).

[5]Syria (PAPFAM, cited in UNICEF, 2016).

[6]Jordan (Hossain et al., 2016), Jordan (UNHCR et al., 2019).

[7]Turkey (ASAM).

[8]Egypt (IOM) (Pernitez-Agan et al., 2019), Greece (IOM) (Pernitez-Agan et al., 2019), Iraq (IOM) (Pernitez-Agan et al., 2019).

[9]Turkey (IOM) (Pernitez-Agan et al., 2019), Jordan (IOM) (Pernitez-Agan et al., 2019), Lebanon (IOM) (Pernitez-Agan et al., 2019), Turkey (Hacettepe University Institute of Population Studies, 2019).

[10]Syria (PAPFAM, cited in UNICEF, 2016)

[11]Turkey (ASAM), Turkey (IOM) (Pernitez-Agan et al., 2019), Egypt (IOM) (Pernitez-Agan et al., 2019), Jordan (Hossain et al., 2016), Jordan (UNICEF), Jordan (UNHCR et al., 2019), Lebanon (UNICEF, 2013), Lebanon (Hossain et al., 2016), Iraq (Hossain et al., 2016), Turkey (Hacettepe University Institute of Population Studies, 2019), Syria (PAPFAM year, cited in UNICEF, 2016)

[12]Turkey (ASAM), Turkey (IOM) (Pernitez-Agan et al., 2019), Egypt (IOM) (Pernitez-Agan et al., 2019), Jordan (Hossain et al., 2016), Jordan (UNICEF), Jordan (UNHCR et al., 2019), Lebanon (UNICEF, 2013), Lebanon (Hossain et al., 2016), Iraq (Hossain et al., 2016), Turkey (Hacettepe University Institute of Population Studies, 2019)

[13]Jordan (IOM) (Pernitez-Agan et al., 2019), Lebanon (IOM) (Pernitez-Agan et al., 2019), Greece (IOM) (Pernitez-Agan et al., 2019), Iraq (IOM) (Pernitez-Agan et al., 2019), Greece (Grammatikopoulou et al., 2018).

[14]Syria (PAPFAM, cited ,in UNICEF, 2016)

level of prevalence. In addition to its being within the accepted limits with low level, it has been observed that this study has approached medium prevalence with a 4.8% overweight rate. Overall, overweight Syrian children under TP in Turkey are becoming a danger and public health problem.

11[11]out of 16 studies in Table 12 reveal that stunting prevalence in Syrian children is at medium and high levels. This situation means that stunting in Syrian children can be a risk for public health.

10 studies[12] including this study have found a medium level of stunting among Syrian children, 5 studies[13] found low level and 1 study[14] showed a high level of stunting. As in other forms of malnutrition, the prevalence of stunting was higher in the pre-crisis survey results in Syria than the results of the post-crisis host countries.

In order not to increase the risk for public health, stunting prevalence levels should be reduced to low and very low. Stunting prevents the development of education and economy both in family and society. According to World Bank (2020, cited in FAO, IFAD, UNICEF, WFP and WHOFAO, 2020), childhood stunting causes a 1% reduction of height in adulthood and a 1.4% of reduction in economic productivity. Stunted children get 20% less income than non-stunted children in adulthood. Additionally, childhood stunting increases the risk of having obesity and non-communicable diseases in adulthood (FAO, IFAD, UNICEF, WFP and WHOFAO, 2020).

There is a direct relationship between nutrition in the first 1000 days and stunting. Nutrition for the first 1000 days, which is the most important factor affecting the mental and physical development of the child up to the age of 2 years, involves the adequate and balanced nutrition of the mother before, during, and after pregnancy; the baby being introduced to breastmilk in the first hour of life; exclusive breastfeeding for the first 6 months and continued breastfeeding till the end of 2 years with proper complementary feeding after the end of 6 months.

In the study (FSIN and Global Network Against Food CrisesWFP, 2020) conducted in Syria, a country characterized as a low-middle income country, it is observed that exclusively breastfeeding rate for the first six months is 24%, even this rate reduces to 10% in some regions. A high level of stunting prevalence is inevitable considering these breastfeeding rates. The lower prevalence of childhood stunting in the studies conducted in the host countries reveals the benefits of nutrition, health, and social counseling provided by humanitarian aid organizations. However, the rates are still not at the desired level.

Table 12. Prevalence of malnutrition forms among Syrian children according to various reports/studies

Country and Author	Study Year	Age	N	Wasting Prevalence	N	Stunting Prevalence	N	Overweight Prevalence
1. Turkey (ASAM)	2019-2020	6-59 months	817	3,8	817	17,5	817	4,8
2. Jordan (IOM) (Pernitez-Agan et al., 2019)	2015-2016	6-59 months	5282	4,1	5282	7,4	5282	11,9
3. Lebanon (IOM) (Pernitez-Agan et al., 2019)	2015-2016	6-59 months	4439	2,4	4439	9,6	4439	11,9
4. Turkey (IOM) (Pernitez-Agan et al., 2019)	2015-2016	6-59 months	560	4,6	560	13,2	560	10,0
5. Egypt (IOM) (Pernitez-Agan et al., 2019)	2015-2016	6-59 months	235	8,1	235	16,6	235	9,4
6. Greece (IOM) (Pernitez-Agan et al., 2019)	2015-2016	6-59 months	213	3,2	213	7,5	213	6,6
7. Iraq (IOM) (Pernitez-Agan et al., 2019)	2015-2016	6-59 months	148	9,5	148	7,4	148	6,1
8. Jordan (Hossain et al., 2016)	2014	6-59 months	804	1,0	779	13,0	804	2,1
9. Jordan (UNICEF) (Hossain et al., 2016)	2014	<60 months	896	1,0	896	13,6	-	-
10. Jordan (UNHCR et al., 2019)	2016	6-59 months	1282	2,1	1268	12,3	1282	1,4
11. Lebanon (UNICEF, 2013)	2013	6-59 months	1384	5,9	1384	17,3	-	-
12. Lebanon (Hossain et al., 2016)	2013	<60 months	1535	2,2	1535	19,1	-	-
13. Iraq (Hossain et al., 2016)	2013	<60 months	944	4,1	944	19,0	-	-
14. Greece (Grammatikopoulou et al., 2018)	2016	1-<5 years	65	4,6	65	9,2	-	-
15. Turkey (Hacettepe University Institute of Population Studies, 2019)	2018	0-59 months	1711	1,9	1651	17,4	1711	10,4
16. Syria (PAPFAM, cited, in UNICEF, 2016)	2009-2010	0-59 months	14335	11,5	14335	27,9	14335	17,9

6. Suggestions

In light of the results of this study, suggestions have been presented as follows to decrease the risk of malnutrition.

The short height of the mother, frequent pregnancies, and adolescent pregnancies increase the risk of stunting (WHO, 2014).

1. **SUGGESTION:** Carrying out necessary training on family planning and the risks of adolescent pregnancies and frequent pregnancies.

The nutrition and health status of the mother before, during, and after pregnancy affect the early growth and development of the child. Intrauterine growth failure due to maternal malnutrition is responsible for 20% of childhood stunting (Black, 2013; Özaltin, 2010; cited in DSÖ, 2014).

2. **SUGGESTION:** Arranging regular screening and follow-up about the nutrition status of the mother during pregnancy and lactation, providing nutrition and health counseling, and carrying out activities about nutrition.
3. **SUGGESTION:** Evaluation of mothers in terms of micronutrient deficiencies at public health level, supporting them with iron, folic acid, and vitamin D supplements within the framework of vitamin programs during pregnancy and lactation, carrying out awareness-raising activities for caregivers on this subject.
4. **SUGGESTION:** : Carrying out individual and group support activities for mothers, as the psychological state of the mother such as anxiety disorder may affect the breast milk.

As in all forms of malnutrition, maternal malnutrition before, during, and after pregnancy, insufficient amount and wrong timing of both breastfeeding, and complementary feeding can be associated with overweight (WHO, 2014).

5. **SUGGESTION:** Ensuring that the baby takes breast milk within the first hour after birth and if it is not possible, supporting the mother to express her milk and feed the baby with this milk.

6.SUGGESTION: Ensuring about exclusively breastfeeding the baby for the first 6 months of life, and continuing breastfeeding with complementary foods until the age of 2 years.

7.SUGGESTION: Carrying out awareness-raising activities and sessions for mothers and pregnant women about the importance and techniques of breastfeeding.

Infant and young child feeding practices affect malnutrition. Other than breastfeeding, not giving adequate, timely, and qualified complementary foods may increase the stunting prevalence (WHO, 2014)

8. SUGGESTION: Carrying out necessary training to caregivers about adequate, timely, and qualified complementary feeding.

Continued decrease in food quantity and variety, monotonous nutrition with low nutritional values, insufficient information about food storage, preparation, and consumption may cause malnutrition (WHO, 2014). Inadequate physical activity and consuming foods with low nutritional values can lead to overweight.

9. SUGGESTION: Raising awareness about clinical symptoms of micronutrient deficiencies and about the groups who are at risk. Organizing informative and awareness-raising activities and seminars periodically; increasing the collaboration with all local and international institutions in order to increase the project implementations.

10. SUGGESTION: Following up the groups who are at risk of micronutrient deficiencies and providing supplementary foods if needed.

11. SUGGESTION: Providing enriched foods with zinc, vitamin D, and vitamin A whose absences are the reason and result of malnutrition in children.

Difficulties in accessing clean water, sanitation and hygiene services may cause malnutrition. Subclinical infections as a result of exposure to a non-clean environment and insufficient hygiene may cause nutrient malabsorption, a disorder in bowel activities, and severe infectious disease and may result in wasting. Severity, duration, and recurrence of the infections and not reaching adequate foods during the treatment of these infections may result in long-term effects (WHO, 2014).

12. SUGGESTION: Carrying out awareness-raising activities about good hygiene practices and providing access to basic hygiene materials.

13. SUGGESTION: Systematically evaluating and monitoring the changing conditions depending on the course of the pandemic by conducting regular field research and allocating additional financial resources for regular monitoring and reporting with relevant partners.

Difficulties in accessing timely, adequate, and affordable health services can lead to malnutrition (WHO, 2014).

14. SUGGESTION: Providing necessary support for accessing health services.

15. SUGGESTION: Developing additional policies and implementations for children who are under the risk of malnutrition and their families; establishing possible and new collaborations for making additional financial resources while maintaining the existing collaborations and policies.

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