T.C.
YEDITEPE UNIVERSITY
FACULTY OF MEDICINE
PUBLIC HEALTH DEPARTMENT

A CROSS SECTİONAL STUDY: THE PREVALENCE OF MALNUTRİTİON AND ITS RELATED RİSK FACTORS IN A GROUP OF SYRİAN CHİLDREN AGED (≥1-<5) YEARS LİVİNG IN TURKEY.

MASTER OF PUBLIC HEALTH THESIS

AMANI ALCHARABI

JANUARY-2022

AMANI ALCHARABI INTERNATIONAL PUBLIC HEALTH MASTER 2022

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APPROVAL

This thesis has been deemed by the jury in accordance with the relevant articles of Yeditepe University Graduate Education and Examinations Regulation and has been approved by Administrative Board of Institute with decision dated ..... and numbered .....

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Director of Institute of Health Sciences

DECLARATION

I hereby declare that this thesis is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which has been accepted for the award of any other degree except where due acknowledgment has been made in the text.

25-1-2022

Amani Alcharabi

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LIST OF ABBREVIATIONS

WHO	World Health Organization
UNHCR	The United Nations High Commissioner for Refugees
SAM	Severe acute malnutrition
UNICEF	United Nations International Children Emergency Fund
NGO	Non-governmental organization
LBW	Low Birth Weight
NBW	Normal Birth Weight
HBW	High Birth Weight
BMI	Body Mass Index
SHS	Second Hand Smoking

ABSTRACT

A cross sectional study: the prevalence of malnutrition and ıts related risk factors ın a group of Syrian children aged (≥1-<5) years living ın Turkey. Yeditepe University, Institute of Health Science, Department of Public Health, MSc thesis, İstanbul.

This study was conducted to assess the nutritional status of a group of Syrian children living in Turkey, define the proportion of malnourished children and the distribution of each type and finally understand the risk factors related to children malnutrition.

Sample size with CI 95%, was calculated with the formula: $N= 1.96^2 * (0.10) * 0.9 / 0.04^2$ =216, but we were able to reach 256 child. A questionnaire done by using google forms was distrubeted online. The questionnaire consists of questions about factors related to malnutrition. Child height and weight was measured to the nearest 0.1 cm / 0.1 kg respectively. Data was entered into SPSS. BMI ”body mass index” equation, WHO “World Health Organization” growth charts, chi-square test were used to analyze it.

51.6 % of the sample was malnourished. Overnutrition was the most common type (22.7%) followed by stunting (18%), wasting (8.2%) and finally underweight (2.7%). Mother occupation (working) was significantly associated with underweight (p=0.000). Marital status as having separated or divorced mother was significantly associated with wasting (0.003) & underweight (p=0.000). In conclusion, malnutrition is a considerable public health problem as it is one of the most stringent issues that obstruct children development. Many factors are causing this problem. In our thesis we were able to study some of these. We were able to take a general look on the situation, but as no enough studies are held on the same population more studies should be held taking on consideration the different layers of the Syrian population living in Turkey.

Key words: Children malnutrition, obesity, overweight, stunting, wasting.

ÖZET

Kesitsel bir çalışma: Türkiye'de yaşayan (≥1-<5) yaşındaki bir grup Suriyeli çocukta malnütrisyon prevalansı ve ilişkili risk faktörleri. Yeditepe Üniversitesi, Sağlık Bilimleri Enstitüsü, Halk Sağlığı Anabilim Dalı, Yüksek Lisans tezi, İstanbul.

Bu çalışma, Türkiye'de yaşayan bir grup Suriyeli çocuğun beslenme durumunu değerlendirmek, yetersiz beslenen çocukların oranını ve her bir türün dağılımını belirlemek ve son olarak çocuklarda yetersiz beslenme ile ilgili risk faktörlerini anlamak amacıyla yapılmıştır.

%95 CI ile örneklem büyüklüğü, N= 1.962 * (0.10) * 0.9 / 0.042 =216 formülü ile hesaplandı, ancak 256 çocuğa ulaşabildik. Google formları kullanılarak yapılan bir anket çevrimiçi olarak dağıtılmıştır. Anket malnütrisyon ile ilgili faktörler hakkında sorulardan oluşmaktadır. Çocuğun boyu ve kilosu sırasıyla en yakın 0.1 cm / 0.1 kg olarak ölçülmüştür. Veriler SPSS'ye girildi. Analiz etmek için BMI denklemi, WHO büyüme çizelgeleri, ki-kare testi kullanıldı.

Numunenin %51,6'sı yetersiz beslenmiştir. Aşırı beslenme en sık görülen tipti (%22.7), bunu bodurluk (%18), halsizlik (%8.2) ve son olarak düşük kilolu (%2.7) izledi. Anne mesleği (çalışıyor) ile düşük kilo arasında anlamlı bir ilişki vardı (p=0.000). Anneden ayrılmış veya boşanmış olarak medeni durum, aşırı kilolu (0,003) ve zayıf (p=0,000) ile anlamlı olarak ilişkiliydi. Sonuç olarak, yetersiz beslenme, çocukların gelişimini engelleyen en katı konulardan biri olduğu için önemli bir halk sağlığı sorunudur. Bu soruna birçok faktör neden oluyor. Tezimizde bunlardan bazılarını inceleyebildik. Duruma genel bir bakış atabildik, ancak aynı nüfus üzerinde yeterli çalışma yapılmadığından, Türkiye'de yaşayan Suriyeli nüfusun farklı katmanları dikkate alınarak daha fazla çalışma yapılmalıdır.

Anahtar kelimeler: Çocuklarda yetersiz beslenme, obezite, fazla kilo, bodurluk, israf.

1.INTRODUCTION AND PURPOSE

1.1 Background of the Study

Malnutrition is a nutritional problem which refers to deficiencies, excesses or imbalances in person's intake of nutrients and/or energy[1]. Malnutrition has three types:
1- Micronutrient-related malnutrition, which includes micronutrient deficiencies (lack of important vitamins and minerals) or micronutrient excess[1].
2- Undernutrition, which includes underweight (low weight-for-age), stunting (low height-for-age) and wasting (low weight-for-height)[1].

- Underweight: A child who is underweight may be stunted, wasted, or both.
- Stunting: It is the result of chronic or recurrent undernutrition, usually associated with poor maternal health and nutrition, poor socioeconomic conditions, frequent illness and/or inappropriate infant and young child feeding and care in early life[1].
- Wasting: It usually indicates recent and severe weight loss, because a person has had an infectious disease, such as diarrhea and/or they have not had enough food to eat, which has caused them to lose weight. A young child who is moderately or severely wasted has an increased risk of death, but treatment is possible[1].

3- Overweight, obesity and diet-related noncommunicable diseases.

- Overweight or obesity: Overweight and obesity result from an imbalance between energy consumed (too much) and energy expended (too little). So, a person becomes too heavy for his/her height. Abnormal or excessive fat accumulation can impair health. Globally, people are consuming foods and drinks that are more energy-dense (high in sugars and fats), and engaging in less physical activity[1].
- Diet-related noncommunicable diseases: (NCDs) include cardiovascular diseases (such as heart attacks and stroke, and often linked with high blood pressure), certain cancers, and diabetes. Globally, unhealthy diets and poor nutrition are among the top risk factors for these diseases [1].

Malnutrition is one of the biggest global health challenges as every country in the world is affected by one or more shape of it. The medical, social, economic and developmental impacts of the global burden of malnutrition are critical and long standing, for individuals and their families also for communities and countries. Also, malnutrition decreases productivity, delays economic growth, and raises health care costs which can be an ongoing cycle of poverty and ill health[1].

The first 1000 days of child's life (from conception to the 2nd birthday) are the most critical period. So, in case of an appropriate nutrition, this will assure the best possible start in life, with long-term benefit and vice versa, inappropriate nutrition, breastfeeding, eating habits, low socioeconomic conditions, will affect negatively child health and growth on both short and long terms[1].

A report published on 2018 by the WHO about under-five years children, estimated that only in 2016, 155 million children were stunted, 52 million were wasted, 17 million were severely wasted while 41 million were overweight or obese[1].

Around 45% of deaths among children under-five years are related to undernutrition. Which mostly occur in low- and middle-income countries. At the same time rates of childhood overweight and obesity are rising in these same countries[1].

More than one billion children are severely forbidden of at least one of the essential goods and services they need to grow, develop and survive. These include water, nutrition, access to basic healthcare services, adequate shelter, sanitation facilities, education and information[2].

1.2 Problem Statement

As the conflict is still on going in Syria since 2011 till present time, many Syrians had moved to neighboring countries like Jordan, Lebanon and Turkey. Regarding to UNCHR, Total number of registered Syrian refugees is 5,663,558, 64% of them are in Turkey[2]. According to the UNCHR number of registered Syrian refugees reached 3.5 million in 2020[3], nearly half of them are children. Most of the Syrian refugee (93%) are living in the host community in urban, peri-urban and rural areas, mostly in the South East of Turkey. The remaining Syrian refugees (7%) live in the 21 official temporary accommodation centres in provinces along the Syrian border. However, large numbers of Syrians under temporary protection have moved to other parts of Turkey. It is estimated that over 500,000 refugees are living in Istanbul making it the largest refugee hosting city in Turkey. Substantial populations are also found in Izmir, Ankara and other large cities in Turkey[4].

As a result of migration and hard life conditions, malnutrition became extremely common among children refugee. They have amenability to improper infant and young

child feeding practices, unsafe drinking water, poor hygiene, lack of immunization and diseases[5].

A report done in Lebanon by UNICEF "United Nations International Children Emergency Fund" on 2014, showed a preparatory result that almost 2,000 Syrian refugee children are suffering from SAM "severe acute malnutrition", and need immediate treatment to survive[5].

The UNICEF is working with different partners like NGO's "non-governmental organization" and hosting countries to decrease the impact of the crisis on Syrian children in the areas of health and nutrition improvement, education, child protection as well as youth participation[6].

In 2016, UNICEF and the government of Turkey cooperated to address nutrition and hygiene needs of Syrian children – particularly those living in the host communities – more than 2200 children were given nutrition screenings; 45 were identified with moderate acute malnutrition and enrolled in treatment programs[6].

In 2017, UNICEF worked with partners inside Syria and they were able to screen 1,825,941 children and pregnant and lactating women for acute malnutrition. Additionally, 7210 children treated for SAM[7].

The Syria Humanitarian Needs overview (2018) estimated that more than 3 million children under the age of five require nutrition support, including nearly 20,000 children suffering from SAM and around 85000 are acutely malnourished in different regions of Syria. [8]

1.3 Main Objective

To evaluate the nutritional status of a group of Syrian children living in Turkey. We want to know the number of malnourished children in our sample, prevalence of malnutrition different types and understand the related factors.

1.4 Scope of the Study

The study focused on children aged ≥1 and <5 years living in Turkey. They were the targeted population as under-five children are the most age group at risk of malnutrition.

1.5 Significance of the Study

The study provides information that would be used for nutritional surveys and programs that focus on the same population. The study present new knowledge that would be used in future researches by sharing the existing literature especially the ones related

to malnutrition among under-five children. So, at the end of this study we will be able to evaluate the situation by knowing the prevelance of malnutrition and its risk factors which can help in preventing or at least decreasing numbers of new cases. We need to know the types and prevelance risk factors.

2. LITERATURE REVIEW

2.1 Introduction

The section presents a synthesis of the reviewed literature on the under-five children malnutrition determinants in different countries and conditions.

2.2 Malnutrition Among Under-Five Children

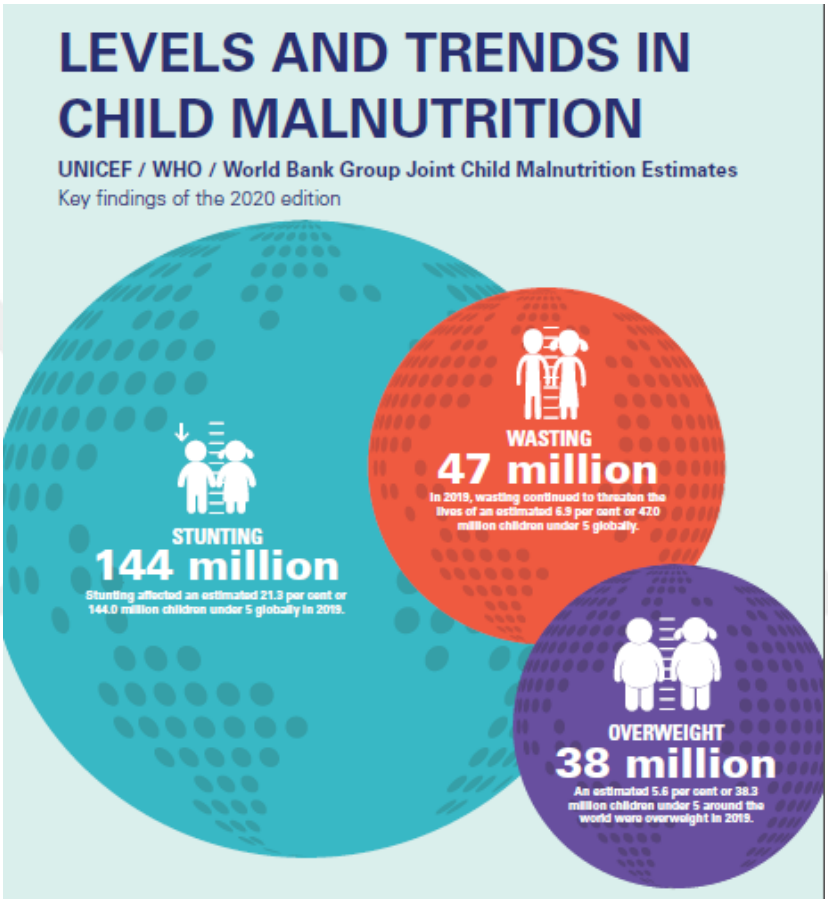

Figure 1.1: UNICEF/WHO/World Bank Group – Joint Child Malnutrition Estimates 2020 edition

Research findings ensure that childhood malnutrition is a considerable public health problem worldwide as it is one of the most stringent issues that obstruct children development both on the mental and physical aspects. In addition to increasing morbidity and mortality rates among children, it also leads to reduced work capacity and poor productivity when these children grow up as adults, delaying the development of countries [9].

2.3 The Situation in Arab Countries

2.3.1 Under-Nutrition

In all Arab countries, undernutrition is common among preschool children (<5 years). Stunting is the most common type with 22.5% and 9.2% of the under-five children were wasted [10]. It has been estimated that the prevalence of stunting among children under-five years ranges from 8% in Qatar to 53% in Yemen. In general, low-income countries like Sudan, Somalia, Djibouti, Mauritania and Yemen have the greatest prevalence of undernutrition among under-five years children, compared to other countries[11].

Weaning habits are believed to be one of the major factors related to infant's undernutrition in Arab countries. Many mothers insert local herbs, liquids and food at the first or second month of infant life. Furthermore, introducing bottle feeding at early stage may lead to early suspension of breastfeeding, as well as child exposure to diarrhea and infections[11].

Various factors participate in undernutrition among preschool children in the region. Specially among poorer countries, such as Yemen, Sudan, Somalia and Djibouti. Such as poverty, poor sanitation, low availability of foods, unhygienic environment, lack of access to safe clean water, high prevalence of infectious diseases, illiteracy, poor sanitation and limited access to primary health care and health services. In higher income countries, like the Arab Gulf countries, factors associated to undernutrition among this age group are mainly unhealthy dietary habits and absence of nutritional awareness[11].

2.3.2 Over-Nutrition

During the last 50 years, most of the Arab countries have faced noticeable changes in their demographic, socio-economic, and health status. All of these changes effected the lifestyle of the population including access to modern amenities e.g., electricity, television, motor vehicles and refrigeration. As a result, levels of physical activity were affected negatively. Moreover, introduction of a range of processed foods, resulting from trade and interchange with Western and Asian countries and the increased commerce. Similar to the situation in many developing countries, the populations of Arab countries are facing a nutrition transition characterized by replacement of traditional diets with diets higher in fat and refined and processed foods. New foods and food ingredients have been

introduced to the diet in the Arab countries to varying extents. These changes in lifestyle and dietary patterns have been associated with diet-related chronic diseases such as cancer, obesity, type 2 diabetes mellitus, osteoporosis and cardiovascular diseases. Physical inactivity, high intake of fast foods and excess intake of food outside the home, long periods watching television or using the internet and food advertisements are also reported to be linked with obesity among children and adolescents in some countries of the Arab region[11].

Unexpectedly, undernutrition, especially stunting, could be another contributing factor for the high prevalence of overweight in the region. Numbers in 2020 showed that the percentage of overweight in under- five children was 9.2%, also Arab region was ranked second for adult obesity in the world in 2019[10]. In a study among five Arab countries, namely Morocco, Djibouti, Yemen and Libya, it was found that the risk ratio (RR) for overweight in stunted children ranged from 2.14 in Djibouti to 3.85 in Libya. Recent indicators showed that metabolic alterations in children suffering from under-nutrition in all tissues and body systems. These alterations are towards energy conservation and maintaining a low metabolism. Stunted children have impaired regulation of food intake and have higher susceptibility to the effects of high fat diets. When energy intake improves, deposition of fat over time may result. The association between catch-up growth of infant and obesity in later life should also be taken in consideration. It was found that children who showed catch-up growth between zero to two years were fatter and have more central fat distribution at five years than other children[11].

2.4 Related Factors of Malnutrition Among Under-Five Children

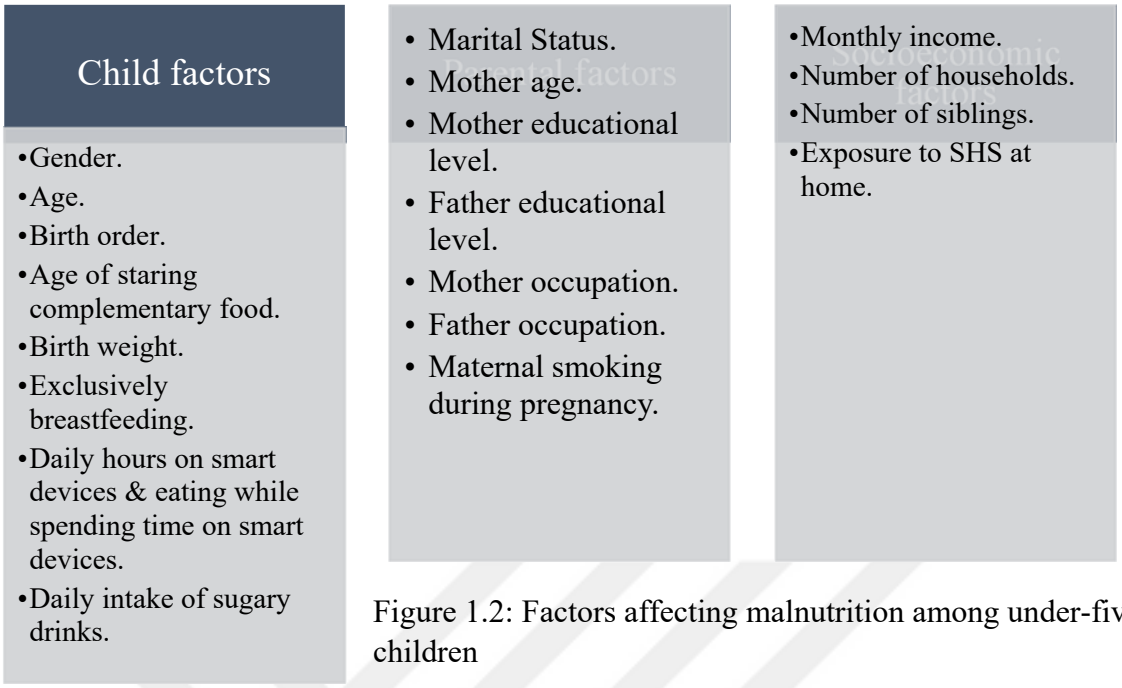

Figure 1.2: Factors affecting malnutrition among under-five children

There are number of risk factors that researchers found significant relation related to under-five malnutrition. For instance, some causes of undernutriton can be diseases (like diarrheal disease, acute respiratory infections, and other chronic diseases e.g. tuberculosis), inadequate dietary intakes, poor water and sanitation conditions, illiteracy of the parents, and poverty[12]. Some causes of overnutrition can be high birth weight, maternal smoking during pregnancy, watching television or playing video games for more than 1 hour per day, eating snacks while watching television, early introduction of solid foods[13]and sugary drink consumption[14].

So at the end we divided the factors we needed into three groups, as shown.

2.4.1 Child Related Factors

2.4.1.1 Child Gender

An article indicated that male subjects who had undernutrition was higher than females but the difference was not statistically significant[15]. Other study found that there was a significant relationship with childhood malnutrition and female gender[16]. A different findings was reported showing that there was no gender wise variation in proportion of children with under nutrition among study subjects[17].

- Underweight: In some studies, underweight was significantly associated with child gender, as children were more likely to be underweight if they were male[18-20]. Other studies have different findings as girls were found to be more underweight than

a boy child [21-25]. One of the studies we reached found that underweight was not significantly associated with gender[26].

- Stunting: Couple of studies found a higher prevalence of stunting among boys than among girls[27-30]. Other studies should that stunting was significantly higher among girls [23, 31]. Many other articles didn't find any significant relation between gender and stunting[26, 32-35].
- Wasting: In one of the study findings, wasting was significantly higher among girls [31]. Conversely, a study resulted that female children showed reduced odds of wasting than male children[36]. Other articles found no significant relation between gender and wasting[34, 35].
- Overweight or obesity: Being at-risk, or overweight or obese were closely related to being male[37, 38]. Also, proportion of overweight and obesity was found to be higher among male children, but no significant association was found[39, 40].

Overall, we didn't have a clear idea about the relation between gender and malnutrition.

2.4.1.2 Child Current Age

A study found that the rate of undernutrition increased as child's age increase [31].

- Underweight: A study showed that the 12-23-month age group had maximum number of underweight children [25]. Another reported that prevalence of underweight was found to be more among 25-36 months children.[41]. Children of 24–45 months age group were 2.36 times more likely to be underweight compared to children who were in an age group of 48–59 months[19]. The prevalence of underweight children was the highest among children aged 24-35 months. This difference was not significant when compared with all other age-groups [27]. Proportion of children with underweight increases significantly with increase in age[17, 24]. On the opposite, another study found that number of underweight children decreased as the age group increased[25].
- Stunting: One study revealed that being in the age up to 36 months was associated with stunting[29]. A study found that prevalence of stunting was found to be more among 25-36 months children[41]. Different finding was reached in Kenya that stunting was significantly ($p<0.01$) more likely in children aged 36-47 months[27]. Similarly, odds of stunting significantly increased with the increase of child's age[30]. Other studies indicated that stunting wasn't significantly associated with child age[25, 32, 42].
- Wasting: A study found that wasting was observed more in age group 49-59 months[41]. Differently, lower odds of wasting were observed among children above 2

years compared with children below 2 years (OR 0.21, 95% CI 0.13–0.32)[36]. Another article showed that wasting wasn't associated with child age[32].

- Overweight or obesity: In Indonesia a study indicated that being at-risk, or overweight or obesity was closely related to being in the age group (2–2·9 years)[37]. In Cameroon, factors that were independently associated with overweight and obesity included being aged between 13–24 months (aOR = 1.81; 95% CI = 1.21 to 2.66) and 25–36 months (aOR = 2.79; 95% CI 1.93 to 4.13)[38].

Regarding child age we can see different results, so we didn't reach any conclusion that we would generalize, but we can notice that most the articles we reached found that the age 24-36 was associated with being overnourished.

2.4.1.3 Birth Order

- Underweight: Couple of articles reported that a child whose birth order is three or more is more likely to be underweight relative to a child of a lower birth order[24, 41, 43].
- Stunting: In Pakistan, children having a birth order of fifth or higher had more chances of stunting compared to the first and second child (OR = 1.60; 95% CI: 1.13–2.21)[44]. Differently, stunting was highest among children of birth order 1–4 than those of order 5 and above[43].
- Wasting: Children of birth order 3–4 were more wasted than those of birth order 1–2 or more than 5 [43]. Prevalence of wasting was significantly higher among children belonging to higher birth order ≥4[41]. In a rural part of India, a study indicated that birth order of child >2 was observed to reduce the risk of SAM[45].
- Overweight or obesity: In Cameroon, one of the factors that were independently associated with overweight and obesity included low birth rank 1-3 (aOR = 1.35; 95% CI 1.06 to 1.72)[38].

So, we can conclude that high birth order could be a risk factor of children undernutrition and low birth order could be associated with overnourished cases.

2.4.1.4 Birth Weight

Infant birth weight is categorized into three classes, LBW "low birth weight" which is < 2.5 kg, NBW which is 2.5-4 kg and HBW "high birth weight" that is > 4 kg[46].

Children who had NBW, had lower odds of undernutrition compared with children with LBW[36, 47].

- Underweight: Being born with LBW appears to carry a higher risk of being underweight in the first five years of life [21, 24, 30, 37, 41].
- Stunting: Many articles found association between child LBW and being stunted [29, 34, 37, 41, 44, 48]. Vice versa, children born with larger than average weight were less likely to be stunted[30].
- Wasting: LBW was found to be an associated risk factor of wasting in different articles[34, 41, 44, 45].
- Overweight or obesity: A birth weight ≥ 2.5kg was associated positively as a risk factor of child overweight[29]. A HBW was significantly associated with a higher risk of overweight /obesity during early childhood.[38, 49, 50].

Finally, we can notice that there is a great association between birth weight either it was LBW or HBW in under-five malnutrition. LBW was a risk factor of underweight, stunting and wasting. HBW was a risk factor of being overweight or obese.

2.4.1.5 Exclusively Breastfeeding

The proportion of undernutrition were significantly higher among children who were not exclusively breastfed[41]. Also, children who was exclusively breastfed for >6 months or <4 months at the highest risk of being under-nourished[34].

- Underweight: Children who were breastfed for <3 months[21] or ≥6 months have more prevalence of underweight compared to the other children[37].
- Stunting: Couple of articles reveled that most of the under-five stunted children are at risk of being stunted were exclusively breastfed for less than 6 month [48, 51] and more than 6 months[37, 42, 48, 51].
- Wasting: An article done in Pakistan found that the odds of wasting were 1.60 times more in children who were not breastfed[44] . In India odds of a child being SAM increased significantly if the child was exclusively breastfed for ≤4 months or >6 month[34, 45]. Also, high odds of wasting were observed among children who were not exclusively breast-fed for the first six months (AOR = 5.63; 95% CI: 1.7, 18.36)[23].
- Overweight or obesity: A study showed that exclusive breastfeeding for 6 months in HBW and NBW infants was associated with a lower risk of childhood overweight and obesity[50].

Consequently, most of the literature findings were about the association between exclusively breastfeeding for more than 6 months or less than 4 months or not being breastfed and the risk factor of being undernourished.

2.4.1.6 Age of Introducing Complementary Food

Inappropriate timing for introducing some kinds of complementary food to a child could impact child nutritional status as her/his digestive and immune systems are not yet mature. Introducing supplements before earlier, could be an important cause of malnutrition especially if introduced under unhygienic conditions [37].

- Stunting: Children who started complementary food before six months of age were 2.1 times and those who started after six months of age were 1.8 as likely to be stunted as children who started complementary food at six months[52].
- Wasting: In a case control study, one of the risk factors of SAM was receiving complementary feed before 6 months[9].
- Overweight or obesity: A systematic review revealed no clear association between the timing of the introduction of complementary foods and childhood overweight or obesity, but some evidence suggested that very early introduction (at or before 4 months), rather than at 4–6 months or > 6 months, may increase the risk of childhood obesity[53]. Similarly, no significant relationship was observed between delaying introduction of complementary foods after 6 months of age, and being overweight or obese during childhood[54]. Conversely, significant association was found between overweight or obesity and age of starting added food, as highest proportion of overweight was noticed among children who started food at age of 6 months and older[39].

In general, staring complementary food before 6 month of age was associated with under-five malnutrition.

2.4.1.7 Watching/Playing with Smart Devices and Eating Snacks While Watching/ Playing with Smart Devices

- Overweight or obesity: A study from Germany resulted that watching television or playing video games for more than 1 hour per day, eating snacks while watching television were risk factors for overweight or obesity [49]. Also, significant association was found between overweight or obesity and the watching of television hours, as proportion of overweight and obesity was found to be higher among children who watch television four hours per day[39].

Therefore, watching television/playing with smart devices and eating while watching television or playing with smart devices increases the prevalence of overweight or obesity in under-five aged children.

2.4.1.8 Sugary Drink Consumption

- Overweight or obesity: A study found that consumption of ≥12 fl oz/day (355ml/day) of fruit juice by preschool children was associated with short stature and with obesity[55]. Also similar results for children consuming sugary drinks (e.g., vitamin C containing juices, fruit drinks, and soda) in an average of 1-2 times daily were identified at risk for overweight and increased their odds of becoming overweight by 60%[56].

Therefore, high intake of sugary drinks increases the prevalence of overweight or obesity in under-five aged children.

2.4.2 Parental Related Factors

2.4.2.1 Marital Status

An article showed that there was no significant relationship between marital status and undernutrition[43].

- Underweight: Children among married women were less likely to be underweight compared to child mothers who were divorced or widowed (AOR=0.48 95% CI= 0.23, 0.99)[57].
- Stunting: In Kenya, a study found that stunting wasn't associated with mothers marital status[32]. Otherwise, odds of being stunted was 0.51 times lower among married women than divorced/widowed women (COR=0.51 95% CI=0.28, 0.94)[57].
- Overweight or obesity: A study indicated that child being overweight has no significant association observed with marital status[38].

Not many articles studied the association between marital status and under-five malnutrition, but from what we reached, we found that underweight & stunting odds were less in children to married women.

2.4.2.2 Mother Age

- Underweight: Children were also more likely to be underweight if their mothers were over 35 compared to those aged 17 to 24 (OR = 1.67, 95 % CI: 1.04, 2.70)[20].
- Stunting: Stunting was commonest where mother's age was <20 years as compared to number of stunted children where mothers age was more than 30 years[25].

- Overweight or obesity: A study in Cameroon indicated that child being overweight has no significant association with mother's age [34]. Risk of overweight or obesity consistently increased with decreasing maternal age [58].

Other articles find nor significant relationship between age of mother and under-five undernutrition [25, 43], neither under-five malnutrition[15].

Many of the findings we reached showed no significant relation between mothers age and child malnutrition. In addition, some articles showed that low maternal age (<20), or high maternal age (>35) could be a risk factor of child malnutrition.

2.4.2.3 Mother Educational Level

Education of mother significantly influenced the nutritional status of under-fives as the prevalence of undernutrition was 60.9% where mother was illiterate and it was only 21.2% where education level was more than high school[25]. But in another study, there was no significant relationship between mother's education level and undernutrition indicators [43].

- Underweight: A study resulted that prevalence of underweight was more in children with uneducated mothers (29.5%) compared to children whose mothers studied more than higher secondary school (20.93%) but the maternal education did not show any significance[21].Children were more likely to be underweight if their mothers had either no education or primary education only [18, 20, 26, 30]. Similarly, while the education of mothers increased, children were significantly less likely to be underweight [19, 24].On the opposite, odds of being underweight were higher among children whose mothers had secondary or higher levels of education compared with children whose mothers had no education (OR 0.52, 95% CI 0.31–0.84)[36].
- Stunting: Mother's education was inversely related to the prevalence of stunting where stunting was lowest when mothers schooling were more than high school[25]. Also several articles insured that children of uneducated/illiterate mothers [22, 26, 28, 34, 44, 59], those how never attend formal education [37] and those with only primary education[22, 26] were at risk of being stunted. Less article should insignificant relation between mother level of education and child being stunted[32, 33, 38].
- Wasting: A study found that the chances of wasting were more in children if their mothers did not have formal schooling (OR = 3.33; 95% CI: 1.41–7.90)[26]. In addition, the odds of a child being in the SAM category increased significantly if the child has a mother with a lower level of education[45]. Another study found that wasted children

were children to illiterate mothers and the lowest in mothers with higher education[34]. Wasted children were found in illiterate mothers were around 26%. However, it wasn't found to be statistically significant[41].

- Overweight or obesity: Being at risk of overweight or obesity or overweight or obese was associated with high parental formal education[37]. Similar findings from Cameroon indicated that mother's highest level of education was associated with being overweight, but the associations did not remain significant in the multivariate analysis[38]. Conversely, highest frequency of obesity was noticed among children whose mothers had lower level of education[39].

- So, we can see that many researchers studied the relationship between mother education and child malnutrition. Most of these researches find that low educational level was a risk factor of children undernutrition and high educational level was a risk factor of children overnutrition.

2.4.2.4 Father Educational Level

No or primary education of father was risk factor of undernutrition (OR = 1.182, p-value = 0.011), [26].

- Underweight: Children of fathers who have completed higher education are less likely to be underweight (OR 0.48, 95% CI 0.4 to0.6)[24]. Similarly, higher fathers' education was also a powerful factor in reducing children's underweight [60].
- Stunting: Odds of being stunted was found to be higher in children having uneducated fathers[44]. Children from illiterate father or father with primary education were 20% to 30% more likely to remain stunted in comparison with their counterparts [26]. In Egypt, while no clear and significant pattern was observed with father's education on stunting, the odds of stunting were 0.76 times lower among children whose fathers had at least higher secondary education as compared to children born to fathers with no education[28]. Also, a study from Kenya showed that stunting wasn't associated with father education[32].
- Wasting: In Van, Turkey a study indicated that wasting was statistically significant in association with educational level of father (primary or less)[15].
- Overweight or obesity: Being at-risk, or overweight or obesity were closely related to having parents with higher education [37]. On the contrary, highest frequency of obesity was noticed among children whose fathers had lower level of education[39].

Most of the articles we had reached showed a negative effect of father low educational level which can be a risk factor of child undernutrition and that high educational level was a risk factor of children overnutrition.

2.4.2.5 Mother Occupation

One of the maternal factors, that were directly related to childhood undernutrition was maternal unemployment[16]. Vice versa, another article showed that there were no significant relationships between undernutrition and mother occupation[15].

- Underweight: Children whose mothers' were housewives were 3.26 times more likely to be underweight than those of employees[19]. Different findings reported that chances of being underweight increased if the mother was employed (46.15%) than the group where the mother was unemployed (37.8%)[25].
- Stunting: Stunting was 5 times higher among the children whose mothers did not have any earning compared to those who had earning[48]. But in a different study, results showed that 58.97% of stunted children have employed mothers as compared to prevalence of 44.8% where mother was a housewife[25].
- Wasting: Odds of a child being in the SAM category increased significantly if the child have a working mother[45]. Otherwise, mother's occupation did not exhibit any statistically significant differences in the prevalence of wasting among children ($p>0.05$)[61].
- Overweight or obesity: A study from Cameroon indicated that mother's highest level of occupation was associated with being overweight but the associations did not remain significant in the multivariate analysis[38]. Highest frequency of obesity was noticed among children whose mothers were employee, but also the association wasn't significant[39]. The prevalence of obese children reared by housewife mothers was found higher in comparison to working mothers[62].

So, we can notice that there is a relation regarding mother occupation and child malnutrition status but this relation isn't clear.

2.4.2.6 Father Occupation

Father's occupation (defined as laborer vs. other) was statistically significant with malnutrition[63].

- Underweight: Severely underweight children were more likely to have a father who had a lower paying job like rickshaw pullers or unskilled day labourers [adjusted OR (AOR)=4.4, 95% CI 3.1-6.1)[64].

- Stunting: A study done in Mexico indicated that one of the risk factors for stunting was father with unstable job[42]. Stunting was statistically significant in association with employment status of father(unemployed)[15]. Otherwise, father's occupation did not appear to significantly affect stunting[34].
- Wasting: The odds of a child being in the SAM category increased significantly if the child has an unemployed father. Wasting was statistically significant in association with employment status of father(unemployed)[15].
- Overweight or obesity: Highest frequency of obesity was noticed among children whose fathers where employee, but no significant associations were found between overweight or obesity and occupation of father[39].

So, we can have a generalize conclusion that unemployed father or a father with unstable occupation, is a risk factor that effect child nutritional status and make the child at risk of being malnourished.

2.4.2.7 Maternal Smoking During Pregnancy

- Underweight: Smoking behavior of mothers was found to have no significant association with children being underweight in Punjab, Pakistan[24].
- Overweight or obesity: A study done in Germany mentioned that, higher prevalence of overweight and obesity was found in children of mothers who smoked during pregnancy[49]. Similarly, maternal smoking increased chance of overweight[65]. Also another study had similar outcomes, by comparing children whose mothers smoked and children whose mothers didn't smoke during pregnancy, the first group were at elevated risk for overweight (pooled adjusted odds ratio (OR) 1.50, 95% CI: 1.36, 1.65) compared with children whose mothers did not smoke during pregnancy[66] .

Other study indicated that there was no significant relationship between malnutrition and maternal smoking[15].

From what we reached we can say that children whose mothers smoked during pregnancy were at high risk of bring overnourished (overweight or obesity).

2.4.3 Socioeconomic factors

2.4.3.1 Monthly Income

Poverty is one of the significant variables that increases the risk of childhood malnutrition[16]. People who are poor have more chances to be affected by different forms of malnutrition[1].

- Underweight: Children who have households with higher income are significantly less likely to be underweight [21, 24].
- Stunting: One of the variables that was significantly associated with stunting were low monthly family income[15, 33, 44].
- Wasting: Children who belong to the low-income group were at a higher risk of being wasted than children of better income families[33, 44].
- Overweight or obesity: Children to families with higher monthly income are at higher risk of being overweight and obese [67]. Conversely, low-income preschool children are at high prevalence of overweight[40].

At the end we can see a clear relation between poverty /low-income and children malnutrition status.

2.4.3.2 Number of Households Members

- Underweight: Household size were found to have no significant association with children being underweight in Punjab, Pakistan[24]. Otherwise, having a large number of individuals in the household was found to be a protective factor against underweight as children from families with 5-6 members were found to be 0.2 times more likely to be underweight than children from families with ≤4 members. In addition, children from families with ≥7 members were 0.3 times more likely to be underweight than those from families with ≤4 members[68].
- Stunting: Children living in households with eight to ten [(AOR) = 4.44, 95% CI: 1.65, 11.95] and five to seven [AOR = 2.97, 95% CI: 1.41, 6.29] family members were more likely to be stunted than those living in households with two to four family members[51].

  Also, having a family size of 4–6 (AOR = 2.48; 95% CI: 1.10, 2.15) were positively associated with stunting[23]. Other articles found that no significant relation was between family size and stunting [32, 33].
- Wasting: Also, one of the risk factors of SAM was large family size (≥5 family members) [9, 18]. Otherwise, having a large number of individuals in the

household was found to be a protective factor against wasting as children from families with 5-6 members were found to be 0.4 times more likely to be wasted than children from families with ≤4 members. In addition, children from families with ≥7 members were 0.2 times more likely to be wasted than those from families with ≤4 members[68].

- Overweight or obesity: Children born in a family size of 3-4 persons represented 71.3% of those who were obese with significant difference in comparison with children born in a family size of 5-6 persons or more[62].

Most of the articles we reached showed significant association between large family size and undernutrition also between small family size and overnutrition.

2.4.3.3 Number of Siblings

Most of the articles showed a relation between number of siblings and child malnutrition. In Jabalpur district, India a study resulted that children who were having 2 or more siblings were found to be significantly malnourished[41]. Conversely, a study from Turkey showed that there were no significant relationships between malnutrition and number of siblings[15].

- Underweight: Prevalence of underweight was found to be significantly higher in those with more siblings. Those with no siblings, had the lowest proportion of underweight children (12.8%), higher in those with 1-2 siblings (30.6%) and highest (51.7%) in those with >3 siblings[34].
- Stunting: Odds of stunting were high among children with 1-2 siblings (OR = 1.82; 95%CI 1.36-2.43) it was three times as high among those with ≥ 3 siblings (OR = 3.12; 95% CI 2.18-4.47) compared to single child [29]. The risk of being stunted was directly proportional to the number of siblings with maximum proportions in all categories being found in children with ≥2 siblings and is statistically significant[41]. An article found that was no significant relationship between stunting and number of siblings[34].
- Wasting: The prevalence of wasting was found to be significantly higher in those with more siblings ≥3[34]. The risk of being wasted was directly proportional to having ≥2 siblings and it was statistically significant[41].
- Overweight or obesity: A study revealed that child overweight have a tendency towards significant association in case of no siblings (OR = 1.44; 95%CI 1.00-2.07)[29]. Similarly, risk of overweight or obesity consistently increased with decreasing number of

siblings as having no siblings increased odds of overweight by 1.6 times compared to those who have three or more siblings [58].

We can see that greater number of siblings was a risk factor of undernutrition. On the other hand, having no siblings have an association with overweight.

2.4.3.4 Child Expousre to SHS

Child exposure to SHS "second hand smoking" were associated with different types of malnutrition regardless the timing of exposure, both pre or postnatally was negatively associated with weight causing deficit in weight, risk of underweight, risk of wasting, also effecting the height causing lower length and risk of stunting and elevated BMI of children.[69, 70].

2.5 Summary of Literature Review

1- Child gender: No clear conclusion that we would generalize.

2- Child age:

- Undernutrition: No clear conclusion that we would generalize.
- Overnutrition: Child age 24-36 month was associated with being overnourished.

3- Birth order:

- High birth order could be a risk factor of children undernutrition.
- Low birth order could be associated with overnourished children.

4- Birth weight:

- LBW was a risk factor of underweight, stunting and wasting.
- HBW was a risk factor of being overweight or obese.

5- Exclusively breastfeeding: Exclusively breastfeeding for more than 6 months or less than 4 months or not being breastfed was a risk factor of being undernourished.

6- Age of starting complementary food: Staring complementary food before 6 month was associated with under-five malnutrition.

7- Daily hours on smart devices & eating while spending time on smart devices: Watching television/playing with smart devices and eating while watching television/playing with smart devices increases the prevalence of children overweight or obesity.

8- Daily sugary drinks intake: High intake of sugary drinks increases the prevalence of overweight or obesity in under-five aged children.

9- Marital status: No clear assocation, but underweight & stunting odds were less in children to married women.

10- Mother age: No clear conclusion that we would generalize.

11- Mother education:

- Mother high educational level was a risk factor of children overnutrition.
- Mother low educational level was a risk factor of children undernutrition.

12- Father education:

- Father high educational level was a risk factor of children overnutrition.
- Father low educational level was a risk factor of children undernutrition.

13- Mother occupation: No clear conclusion that we would generalize.

14- Father occupation: Unemployed father or a father with unstable occupation is a risk factor of children malnutrition.

15- Maternal smoking: Children whose mothers smoked during pregnancy were at high risk of being overnourished.

16- Monthly income: Low-income was a risk factor of children malnutrition.

17- Household members:

- Large family was a risk factor of undernutrition.
- Small family was a risk factor of overnutrition.

18- Number of siblings:

- Greater number of siblings was a risk factor of undernutrition.
- Having no siblings have an association with overweight.

19- Exposure to SHS at home: Child exposure to SHS were associated with different types of malnutrition.

3. MATERIALS and METHODS

3.1 Study Design

This study is a cross sectional study.

3.2 Importance of the Study

To evalute under-five malnutriton in a group of Syrian children living in Turkey.

3.2 Study Population and Sampling Technique

The study population were, Syrian children aged 1-5 years (≥1-<5) and living in Turkey. Inclusion Criteria: Syrian child, aged between 1-5 (≥1-<5) years old, healthy (not suffering from any chronic disease), living in Turkey, parents knew the child current height & weight, parents are able to answer the online questionnare and willing to participate. Exclusion Criteria: non-Syrian child, not living in Turkey, aged less than 1 and greater than 5 years, parents didn't know the child current height & weight, parents left any of the questions without answer.

The sample size with a confidence interval of %95 was calculated with the formula: $N= 1.96^2 * (0.10) * 0.9 / 0.04^2 =216$ (where 0.10 stands for the estimated prevalence "p" considering the similar studies, 0.9 stands for "1-p", 0.04 stands for the desired precision. The total sample size we reached was 276, but 20 of them were excluded as they didn't fit our inclusion criteria. So the final number of data we were able to reach was 256.

As we haven't had a sampling frame to randomly choose the subjects, we worked only on children who their families completed the online quesstionare.

3.3 Data Collection Method

Data samples were planned to be collected in a primary healthcare center for healthy children who are coming for vaccination or just accompanying their families. First we ask for consent from parents, then measure the weight & height for children, finally distrubute the questionnare for the parents to fill it out while we are with them in case they need any help.

However, due to COVID-19 pandemic, which started at December 2019 and the shutdown and curfew, we weren't able to make the data collection in person" face to face" as planned. Moreover, the pandemic was spreading out more and the situation is becoming more complex. So, we needed another way to collect the data. We decided that the only safe and possible way to carry out data collection was to do it online. So, the same questionnare which was going to be used in person were converted to an online

questionnaire by using google forms. It was written with arabic language as our targted sample are Arabs.

Title and aim of thesis, in addition to inclusion criteria, were mentioned at the begining of the form. Also we clairfed that the filled information are private and will only be used for scientific need. Participants weren't asked to to give their names so we can insure their own privacy. Participants were asked that child height and weight should be measured to the nearest 0.1cm / 0.1 kg respectively. The questionnaire contained around 20 questions most of them were multiple choice, only few were short answer questions. It included 3 parts.

1- Information about child including (age, weight, height, gender, birth order, birth weight, exclusively breastfeeding, daily hours of tv watching and playing mobile/computer games, age of starting complementary food and sugary drinks daily consumption).
2- Information about parents including (marital status, parental education, parental occupation, parental age and maternal smoking during pregnancy).
3- Information about family and living situation including (monthly income, household number, number of siblings, child exposure for SHS in home, city and kind of residency).

After preaparing the online questionnaire, a wide range search were done to reach well known and reliable online groups and accounts for Syrians living in Turkey to help in distrubting the quesstionnaire in these groups and accounts. It was distrubuted on social media websites and accounts like Facebook, Whatsup and Instgram. If any of the filled questionnaire had any of the exclusion criteria, it was directly excluded. Each questionnaire need around 7 minutes to be submitted. After the parents subbmit it, we were able to see the answers. Collecting data took a duration of 5 months (April-August) 2020. At the beginning we recieved many responses but it wasn't enough, so each month we had to re-publish it to get more responses till we reached our needed sample. After this we downloaded all the recieved responses then, translated them to english. BMI was calculated as the given equation (weight in kilograms divided by height in meters squared).WHO growth charts (birth to 5 years (z-scores)) for both girls and boys were used to evaluate the nutritional status for children. We used 8 differnt charts, BMI [71, 72], wasting (weight for height)[73, 74], underweight (weight for age) [75, 76] and stunting (height for age) [77, 78]. Each child nutritional status was checked indivually by using the growth charts and calculating the BMI.

Growth Problems

Compare the points plotted on the child's growth charts with the z-score lines to determine whether they indicate a growth problem. Measurements in the shaded boxes are in the normal range.

Z-score	Growth indicators			
	Length/height-for-age	Weight-for-age	Weight-for-length/height	BMI-for-age
Above 3	*See note 1*	*See note 2*	*Obese*	*Obese*
Above 2			*Overweight*	*Overweight*
Above 1			*Possible risk of overweight (See note 3)*	*Possible risk of overweight (See note 3)*
0 (median)				
Below –1				
Below –2	*Stunted (See note 4)*	*Underweight*	*Wasted*	*Wasted*
Below –3	*Severely stunted (See note 4)*	*Severely underweight (See note 5)*	*Severely wasted*	*Severely wasted*

Figure 1.3: Growth indicators (z-score) [79]

3.4 Data Entry and Data Analysis

Data was entered to SPSS statistics 25 program for anlaysis. A confidence interval of 95% was used in estimating prevalence of every outcome. Appropriate test statistics was used in comparisons including, Chi-square test, t-test variance analysis, etc.

3.5 Limitation of the Study:

As we mentioned preciously, due to COVID-19 pandemic, we weren't able to make the data collection in person" face to face". For that reason, the only safe and possible way to carry out data collection was to do it online, this resulted that we weren't able to choose only refugees in our sample, also the respondents were closely sharing the same charastertics as the sample wasn't random and we weren't able to reach and have a variety of the Syrian community, this may cause the results we had in our data were most likely different from what we found in the literature and what we thought we will find.

4. RESULTS

4.1 Background Characteristics

Regarding the background characteristics of the sample, we looked for the sociodemographic factors of the child, parents and family.

4.1.1 Children Sociodemographic Characteristics

4.1.1.1 Child History

The sample who participated in the research contained of 256 children; the majority of the sample were boys (53.1%). Most of the children aged 12-23 and 48-59 months (25%), (25.4%) respectively. We noticed that (71.9%) of our sample have the 1st birth order and as we go further, we saw less number as the 2nd order child was (18.8%) and only (9.4%) were 3rd child or after. This could be due to the economic and political situation which are causing families to have a smaller number of babies nowadays. Nearly all the children in our sample had NBW (87.1%). The majority of the children in the sample (64.5%) were exclusively breastfed during the first 6 months, this might me due the mother's and community awareness of the breastfeeding importance to child wellbeing or because most of the mothers in our sample are housewives which will make breastfeeding more applicable. Most of the children start having the complementary food after 6 months old (81.6%) which is recommended from the WHO as in this age mothers' milk isn't enough and child needs to take nutrients from different sources[80].

Table 1: Sociodemographic characteristics of children

Child history	Frequency	Percentage (%)
Child gender:		
Female	120	46.9
Male	136	53.1
Child current height (cm):		
Minimum	60	
Maximum	120	
Mode	90	
Mean	92.4	
Child current weight (kg):		
Minimum	8	
Maximum	30	
Mode	13	
Mean	14.5	
Child BMI:		
Minimum	10.4	
Maximum	41.7	
Mode	16	
Mean	17.4	
Child age:		
Minimum	12	
Maximum	59	
Mode	59	
Mean	35.8	
12-23 months	64	25
24-35 months	55	21.5
36-47 months	72	28.1
48-59 months	65	25.4

Birth order:		
1st child	184	71.9
2nd child	48	18.8
3rd child or after	24	9.4
Birth weight:		
<2.5 kg	17	6.6
2.5-4 kg	223	87.1
>4 kg	16	6.3
Exclusively breastfeeding:		
Yes	165	64.5
No	91	35.5
Age of staring complementary food:		
0-6 months	47	18.4
After 6 months	209	81.6

4.1.1.2 Child Current Habits

We asked couple of questions about some daily habits of the child. We found that (61.3%) of them don't drink sugary drinks (like soft drinks, flavored milk, soda and canned fruit juices), this might be either true and shows that parents nowadays are more aware of the negative effects for these kinds of drinks on the child health such as insulin resistance, obesity, caffeine-related effects and dental caries[81], or as it's a bad habit maybe they don't want to give an accurate answer about it. On the other hand, high percentage of children spent many hours daily on smart devices like T.V, smartphones, tablets, laptops and PlayStation. As around two thirds of the sample (62.2%) spent between 2-9 hrs. daily which will affect their health in different aspects not only nutritionally. It's recommended that young children should not spend more than an hour a day watching television and videos or playing computer games and infants less than one year old should not be exposed to electronic screens at all[82].

Table 2: Potential risk factors related to child's daily habits

	Frequency	Percentage (%)
Sugary drinks daily intake (250ml):		
1-5 cups		
occasionally	78	30.5
none	21	8.2
	157	61.3
Eating while watching/ playing with smart devices:		
Frequently	109	42.6
rarely	77	30.1
never	70	27.3
Daily hours spent in watching/ playing with the smart devices:		
1hr.	73	28.5
2-3 hrs.	90	35.2
4-9 hrs.	69	27
None	24	9.4

4.1.2 Parental Sociodemographic Characteristics

The main caretaker for (94.5%) of the children were the mother, which is expected as mothers are usually the main caretaker for children, especially that majority of the mothers in our sample were housewives (72.7%). Only (29.7%), (28.1%) of mothers and fathers respectively have less than bachelor degree (high, middle or intermediate school certificate). This is predictable as our targeted population were people who are interested in participating in this kind of online research, also having smart phones and social media accounts so mainly they will tend to be people with high educational level. In case we collected our data randomly from the street or from humanity organizations, most likely the numbers will be different. (91.4%) of the mothers said that they never smoked during their pregnancy. This maybe either because basically the mother isn't a smoker or a smoker but stopped during pregnancy which in both cases is a good indicator that mothers

care about their health and their baby's health too and are aware of the negative effect of smoking on both long and short terms[49].

Table 3: Sociodemographic characteristics of parents

	Frequency	Percentage (%)
Marital status:		
Married	248	96.9
Separated/divorced	8	3.1
Caretaker:		
Mother	242	94.5
Father/both	14	5.5
Mother education:		
University or higher	180	70.3
Below university	76	29.7
Father education:		
University or higher	184	71.9
Below university	72	28.1
Mother occupation:		
Housewife	186	72.7
Student	25	9.8
Working mother	45	17.6
Father occupation:		
High income job*	80	31.3
Middle income job**	85	33.2
Low-income job***	67	26.2
Other****	24	9.4
Mother age:		
Minimum	17	
Maximum	50	
Mean	27.8	
Mode	27	
17-25 yrs.	84	32.8

26-29 yrs.	97	37.9
30-50 yrs.	75	29.3
Father age:		
Minimum	24	
Maximum	67	
Mean	33.5	
Mode	31	
24-30 yrs.	77	30.1
31-34 yrs.	88	34.4
35-67 yrs.	91	35.5
Maternal smoking during pregnancy:		
Never	234	91.4
Other	22	8.6

4.1.3 Family Sociodemographic Characteristics

Most of the families are made of four members (46.9%). (68%) of our sample are living with a monthly income less than 4000 TL this amount should cover house rent, transportation, health insurance, education, clothes, bills and daily requirements. Almost two thirds of the children aren't exposed to SHS inside their homes, on the other hand (39.8%) are suffering from this problem which have many side effects on their health.

Table 4: Sociodemographic characteristic of family

Factor	Frequency	Percentage (%)
Number of household members:		
3 members	51	19.9
4 members	120	46.9
>4 members	85	33.2
Siblings number:		
0	62	24.2
1	154	60.2
≥2	40	15.6
Monthly income:		
<4000 TL	174	68
≥4000 TL	82	32
SHS at house:		
Never	154	60.2
Frequently	102	39.8

*High income job: Like businessman, manger, doctor or engineer.

**Medium income job: Like teacher, translator, chief or sales representative.

***Low-income job: Like plumber, carpenter or tailor.

**** Other: Like retired, student or unemployed

4.1.3.1 Life in Turkey

- Years in Turkey:

Table 5: Years of living in Turkey

Minimum	1
Maximum	10
Mean	4.7
Mode	5

- Kind of residency:

Many of the families (63.3%) have the temporary protection permit which is given to "the Syrian nationals, as well as stateless persons and refugees from Syria, who came to Turkey due to events in Syria after 28 April 2011 which is provided by the Government of Turkey. The DGMM "Directorate General of Migration Management " is the responsible governmental body for all asylum procedures in Turkey, including the temporary protection regime[83]". The other types of permits differ, as it might be a working, studying or tourist permit. Only (3.5%) of our sample ran away from Syria without having any personal documents.

Table 6: Categories of Turkish residency

Temporary protection permits	63.3%
Tourist permit	19.1%
Working permit	11.3%
Student permit	2.7%
Without documents	3.5%

- City of residency

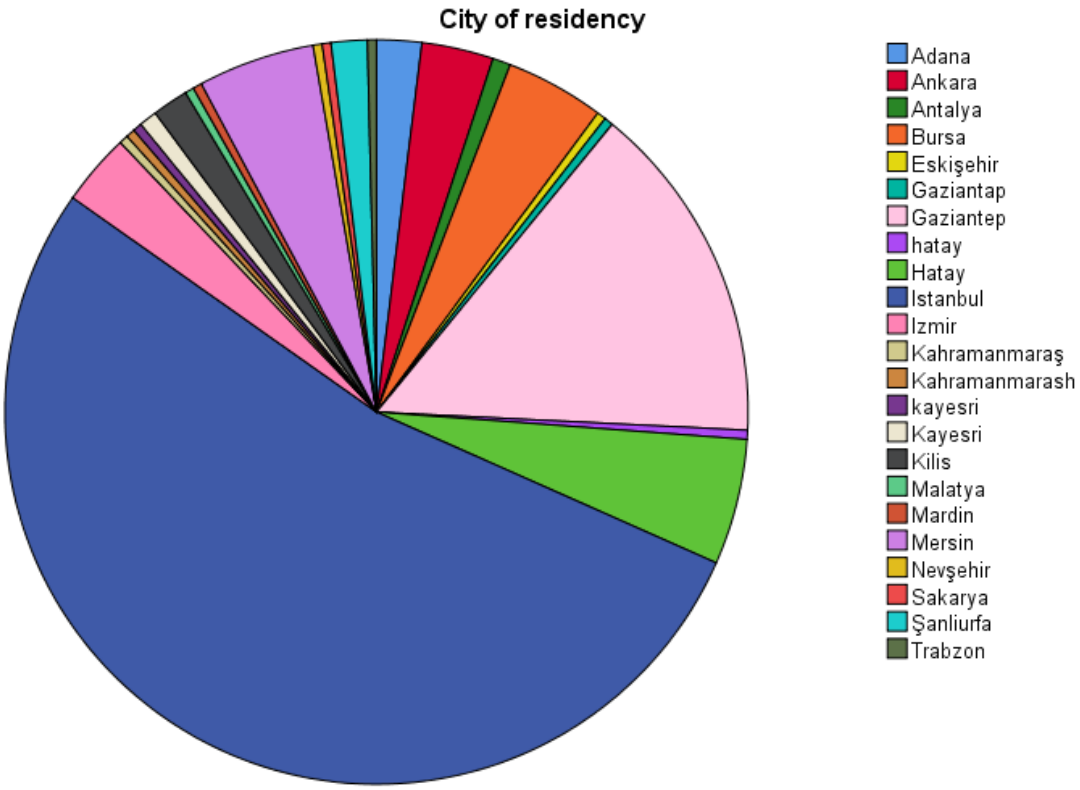

Figure 1.4: Sample distribution in Turkey

4.2 Types and Levels of Malnutrition Among Under-Five Children

From 256 children, 132 have malnutrition in its different kinds, the remaining children are normal (not malnourished) The most type of malnutrition found in our sample was overweight or obesity where 58 children suffer from this nutritional problem. Stunting comes after by 46 stunted children. 21 children are wasted. Finally, few numbers of the children were underweighted. So mainly we found that overnutrition was the most prevalence type of malnutrition in our sample.

Table 7: Malnutrition types distribution among under-five children

Malnutrition type	Frequency	Percentage (%)	SE	CI
Underweight	7	2.7	1.98	(CI 95%: 0.72% - 4.7%)
Stunted	46	18	4.7	(CI 95%: 13.3% -22.7%)
Wasted	21	8.2	3.4	(CI 95%: 4.8% - 11.6%)
Overweight or obese	58	22.7	5.13	(CI 95%: 17.6% - 27.6%)

4.3 Relationship Between Child Factors and Malnutrition Among Under-Five Children

4.3.1 Malnutrition and Child Gender:

- Stunting: We can see that stunting rates are higher in boys than in girls, but we didn't find a significant relation between gender and stunting, also many other articles didn't find any significant relation between gender and stunting[26, 32].
- Wasting: It was higher among girls but the relation was not significant. Some articles have the same results where they didn't find any significant relation between gender and wasting[34, 35].
- Possible risk of overweight: It was higher among girls, but no significant relation.
- Overweight or obese: Number of overweight or obese children were more in boys, this agrees with what we found in the literature where the proportion of overweight and obesity was found to be higher among male children [39, 40], however both associations weren't significant.

Table 8: Association between malnutrition and child gender

	Female n= 120 (%)	Male n=136 (%)	p-value
Underweight	2 (1.7)	5 (3.7)	0.325
Stunted	17 (14.2)	29 (21.3)	0.117
Wasted	13 (10.8)	8 (5.9)	0.139
Overweight or obese	25 (20.8)	33 (24.3)	0.413

4.3.2 Malnutrition and Child Age:

The results shows that malnutrition cases are the most in children aged 36-47.

- Underweight: Most of the underweight children aged 36-47 months, this agrees with a study where children aged 36 -47 months had more than double odds of being underweight, compared to the reference group (0-5 months)[24], but our findings weren't significant.
- Stunting: We didn't find any significant relation as the case in some studies which indicated that stunting wasn't significantly associated with child age[25, 32, 42].
- Wasting: We didn't find any significant relation which also was found in another article where wasting wasn't associated with child age[32].
- Overweight or obese: We found that the maximum number of overweight or obese cases were found in children aged between 12-23months, same thing in a study done in Cameroon, where factors that were independently associated with overweight and obesity included being aged between 13–24 months[38], but our findings weren't significant.

Table 9: Association between malnutrition and child age group

	12-23 months n=64 (%)	24-35 months n=55 (%)	36-47 months n=72 (%)	48-59 months n=65 (%)	p-value
Underweight	0	1 (1.8)	4 (5.6)	2 (3.1)	0.245
Stunted	9 (14.1)	10 (18.2)	13 (18.1)	14 (21.5)	0.767
Wasted	3 (4.7)	5 (9.1)	7 (9.7)	6 (9.2)	0.87
Overweight or obese	18 (28.1)	12 (21.8)	15 (20.9)	13 (20)	0.904

4.3.3 Malnutrition and child Birth Order:

The results shows that malnutrition cases are most common in the 1st child and number decreased as birth order increased.

- Underweight: Couple of articles reported that a child whose birth order is three or more is more likely to be underweight relative to a child of a lower birth order[24, 41], our findings showed that most of the underweight children were those whose birth order was the second, anyway our findings weren't significant.
- Stunting: In Pakistan, children having a birth order of fifth or higher had more chances of stunting compared to the first and second child[43], our results showed the same as having higher birth order was associated with underweight, but our findings weren't significant.
- Wasting: Although our findings aren't significant, but we saw that the number of wasted children decreased as the birth order increased, also in a rural part of India, a study indicated that birth order of child >2 was observed to reduce the risk of SAM[45].
- Overweight or obesity: Despite the fact that our finding wasn't significant, but most of the overweight or obese children had a birth order ≥3, this is the opposite of a study where one of the factors that were independently associated with overweight and obesity included low birth rank 1-3 (aOR = 1.35; 95% CI 1.06 to 1.72)[38].

Table 10: Association between malnutrition and child birth order

	1st child n=184 (%)	2nd child n=48 (%)	3rd child or after n=24 (%)	p-value
Underweight	6 (3.3)	1 (4.2)	0	0.624
Stunted	30 (16.3)	10 (20.8)	6 (25)	0.471
Wasted	17 (9.2)	4 (8.3)	0	0.331
Overweight or obese	39 (21.2)	12 (25)	7 (29.2)	0.621

4.3.4 Malnutrition and Child BW:

Surprisingly, the results shows that malnutrition cases are more in the NBW children.

- Underweight: Most of the underweight children had LBW, this agrees with many articles where being born with LBW appeared to carry a higher risk of being underweight in the first five years of life[21, 24], anyway our findings weren't significant.
- Stunted: Despite that our findings weren't significant, they showed that stunted children were the ones with LBW, this agrees with a study that found that children born with HBW were less likely to be stunted[29, 30].
- Wasted: LBW was found to be an associated risk factor of wasting in different articles[34, 41], in ours most of the wasted children had HBW but our findings weren't significant.
- Overweight or obese: Most of the overnourished children were born with HBW (> kg), also studies found that HBW was associated positively as a risk factor of child overweight. Anyhow our findings weren't significant [38, 84].

Table 11: Association between malnutrition and child BW

	LBW (<2.5 kg) n=17 (%)	NBW (2.5-4 kg) n=223(%)	HBW (>4 kg) n=16 (%)	p-value
Underweight	1 (5.9)	6 (2.7)	0	0.581
Stunted	6 (35.3)	38 (17)	2 (12.5)	0.141
Wasted	0	17 (7.6)	4 (25)	0.331
Overweight or obese	4 (23.5)	47 (21.1)	7 (43.8)	0.445

4.3.5 Malnutrition and Exclusively Breastfeeding During the First 6 Months:

In the literature, most of the articles find that number of malnourished children was less in children that were exclusively breastfed in the first 6 months. But we find the opposite, as 116 children had malnutrition despite that they were exclusively breastfed in the first 6 months. Anyhow none of our associations were significant.

- Underweight: We can't compare it to the literature as our findings compare whether child was exclusively breastfed or not, but in the literature, it was about the duration of the exclusively breastfeeding.
- Stunting: Couple of articles reveled that most of the under-five stunted children or at risk of being stunted were exclusively breastfed for less than 6 months[48, 51], but our insignificant association showed that most of the stunted children were the ones who were exclusively breastfed during the first 6 months.
- Wasting: Percentage of wasted children who weren't exclusively breastfed was higher compared to the breastfed children. This agree with what we found in the literature were high odds of wasting were observed among children who weren't exclusively breastfed during the first 6 months[23].
- Overweight or obese: Most of the overnourished children were the ones who were exclusively breastfed, but our findings weren't significant. This came different from what we found where being exclusively breastfed for 6 months decreased childhood overweight and obesity[50].

Table 12: Association between malnutrition and exclusively breastfeeding during the first 6 months

	Yes n=165 (%)	No n=91 (%)	p-value
Underweight	3 (1.8)	4 (4.4)	0.226
Stunted	31 (18.8)	15 (16.5)	0.681
Wasted	11 (6.7)	10 (11)	0.273
Overweight or obese	41 (24.9)	17 (18.7)	0.302

4.3.6 Malnutrition and Age of Starting Complementary Food:

The results shows that malnutrition cases are more the ones who started complementary food after 6 months age, nevertheless our findings weren't significant.

- Underweight: No clear idea to compare.
- Stunting: No clear idea to compare.
- Wasting: Number of wasted children who started complementary food before 6 were more than the ones who started after. Also, one of the risk factors of SAM was receiving complementary feed before 6 months[9].
- Overweight or obese: Our findings didn't match with a study that found significant association between overweight or obesity and age of starting added food, as highest proportion of overweight was noticed among children who started food at age of 6 months and older[39].

Table 13: Association between malnutrition and age of starting complementary food

	0-6 months n= 47 (%)	After 6 months n=209 (%)	p-value
Underweight	1 (2.1)	6 (2.9)	0.778
Stunted	8 (17)	38 (18.2)	0.872
Wasted	6 (12.8)	15 (7.2)	0.147
Overweight or obese	12 (25.5)	46 (22)	0.763

4.3.7 Malnutrition and Daily Hours Spent Watching/Playing with Smart Devices:

- Overweight or obese: Our study showed that most of the overnourished children were the ones who spent daily between 1hr. watching and playing with smart devices, but our finding wasn't significant.

Table 14: Association between malnutrition and daily hours spent watching/playing with smart devices

	None n= 24 (%)	1 hr. n= 73 (%)	2-3 hrs. n=90 (%)	4-9 hrs. n=69 (%)	p-value
Underweight	1 (4.2)	0	2 (2.2)	4 (5.8)	0.414
Stunted	6 (25)	11 (15.1)	16 (17.8)	13 (18.8)	0.776
Wasted	1 (4.2)	5 (6.8)	5 (5.6)	10 (14.5)	0.114
Overweight or obese	6 (25)	19 (26)	17 (18.9)	16 (23.2)	0.514

4.3.8 Malnutrition and Eating While Watching/Playing with Smart Devices:

- Overweight or obese: Most of the overnourished children rarely eat while watching/playing with smart devices (couple of times monthly), but our finding wasn't significant.

Table 15: Association between malnutrition and eating while watching/playing with smart devices

	Frequently* n=109 (%)	Rarely** n=77 (%)	Never n=70 (%)	p-value
Underweight	5 (4.6)	0	2 (2.9)	0.386
Stunted	20 (18.3)	12 (15.6)	14 (20)	0.773
Wasted	13 (12)	4 (5.2)	4 (5.7)	0.163
Overweight or obese	25 (23)	19 (24.7)	14 (20)	0.431

*Frequently: at frequent intervals.

**Rarely: not often

4.3.9 Malnutrition and Daily Intake of Sugary Drinks:

We noticed that most of the overnourished children 1-5 cups of sugary drinks daily, this comply with a study where drinking sugary drinks 1-2 times daily were identified as risk for overweight and increased the odds of becoming overweight[56]. Anyhow, none of the relations in our sample were significant.

Table 16: Association between malnutrition and daily sugary drinks intake

	None n=157 (%)	1-5 cups n=78 (%)	Occasionally* n=21 (%)	p-value
Underweight	3 (1.9)	4 (5.1)	0	0.445
Stunted	24 (15.3)	17 (21.8)	5 (23.9)	0.744
Wasted	13 (8.3)	2 (2.6)	6 (28.6)	0.996
Overweight or obese	33 (21)	21 (27)	4 (19)	0.425

4.4 Relationship Between Parental Factors and Malnutrition Among Under-Five Children

4.4.1 Malnutrition and Marital Status:

- Underweight: We found significant association between mother being separated or divorced and child underweight, this agrees with the literature where children to married women were less likely to be underweight[57].
- Stunting: No association found, this agrees with another study[32].
- Wasting: We found significant association between mother being separated or divorced and child.
- Overweight or obesity: Overnutrition wasn't associated with the marital status this result was the same in some article[38].

*Occasionally: from time to time.

Table 17: Association between malnutrition and marital status

	Married n= 248 (%)	Separated/divorced n=8 (%)	p-value
Underweight	5 (2)	2 (25)	0.000
Stunted	45 (18.1)	1 (12.5)	0.755
Wasted	18 (7.3)	3 (37.5)	0.003
Overweight or obese	55 (22.2)	3 (37.5)	0.106

4.4.2 Malnutrition and Mother Age:

None of the associations found were significant. This agree with couple of articles that had the same results [15, 21, 43].

Table 18: Association between malnutrition and mother age

	17-25 yrs. n=84 (%)	26-29 yrs. n=97 (%)	30-50 yrs. n=75 (%)	p-value
Underweight	4 (4.8)	3 (3.1)	0	0.178
Stunted	15 (17.9)	17 (17.5)	14 (18.7)	0.984
Wasted	8 (9.5)	8 (8.2)	5 (6.7)	0.705
Overweight or obese	20 (23.9)	22 (22.7)	16 (21.3)	0.946

4.4.3 Malnutrition and Mother Educational Level:

None of the associations found were significant.

- Underweight: A study showed similar results to ours were odds of being underweight were higher among children whose mothers had higher educational level[36].
- Stunting: Some articles showed the same result, as stunting was lowest when mothers schooling was more than high school [25].
- Wasting: We noticed that wasting was more in children to mothers with lower education, this agree with a study where odds of child being SAM increased if the mother has lower level of education [45].

- Overweight or obesity: An article had similar findings, were highest frequency of obesity was noticed among children whose mothers had lower level of education[37, 39].

Table 19: Association between malnutrition and mother educational level

	University or higher n=180 (%)	Below university n=76 (%)	p-value
Underweight	5 (2.8)	2 (2.6)	0.948
Stunted	32 (17.8)	14 (19.4)	0.885
Wasted	13 (7.2)	8 (10.5)	0.395
Overweight or obese	37 (20.6)	21 (27.6)	0.073

4.4.4 Malnutrition and Father Educational Level:

None of the association found were significant.

- Underweight: No noticeable difference to compare.
- Stunting: Similar to our results, a study done in Kenya showed that stunting wasn't associated with father education[32].
- Wasting: In Turkey, a study had similar results from ours, were wasting was statistically significant in association with low educational level of father[15].
- Overweight or obesity: Being at-risk, or overweight or obesity were closely related to having a father with higher education level[37], this is compatible with what we found in our sample.

Table 20: Association between malnutrition and father educational level

	University or higher n=184 (%)	Below university n=72 (%)	p-value
Underweight	5 (2.7)	2 (2.8)	0.979
Stunted	29 (15.8)	17 (23.6)	0.136
Wasted	14 (7.6)	7 (9.7)	0.469
Overweight or obese	37 (20.1)	21 (29.2)	0.121

4.4.5 Malnutrition and Mother Occupation:

- Underweight: Significant association was found were being underweight increased if mother was working, this agree with another study [25].
- Stunting: A study had similar results as more stunted children had working mother [25].
- Wasting: A study had similar results as being in SAM category increased if the child had a working mother [45].
- Overweight or obesity: A study had similar results where no significant association found [39, 62].

Table 21: Association between malnutrition and mother occupation

	Housewife n=186 (%)	Student n=25 (%)	Working mothers n=45 (%)	p-value
Underweight	4 (2.2)	1 (4)	2 (4.4)	0.000
Stunted	32 (17.2)	5 (20)	9 (20)	0.855
Wasted	15 (8.1)	1 (4)	5 (11.1)	0.713
Overweight or obese	41 (22)	8 (32)	9 (20)	0.623

4.4.6 Malnutrition and Father Occupation:

None of the association were significant.

- Underweight: In one of the studies, we reached similar to our findings were underweight children were more likely to have a father who had a low income job[64].
- Stunting: One study found that father's occupation did not appear to significantly affect, which is the same result we have[34].
- Wasting: In the literature a study find that wasting was statistically significant in association with employment status of father(unemployed)[15], in our sample most of the wasted children had fathers with low income job.
- Overweight or obesity: In a similar way, a study didn't find any significant association between children overweight or obesity and occupation of father[39].

Table 22: Association between malnutrition and father occupation

	High income job n=80 (%)	Medium income job n=85 (%)	Low income job n=67 (%)	Other n=24 (%)	p-value
Underweight	1 (1.3)	1 (1.2)	4 (6)	1 (4.2)	0.235
Stunted	13 (16.3)	14 (16.5)	12 (17.9)	7 (29.2)	0.571
Wasted	5 (6.3)	7 (8.2)	8 (11.9)	1 (4.2)	0.485
Overweight or obese	13 (16.3)	20 (23.5)	17 (25.4)	8 (33.3)	0.792

4.4.7 Malnutrition and Maternal Smoking:

Regardless that we didn't reach any significant association, we can't ignore smoking negative effect on health[85]. Also two studies from what we reached found a significant association between overnutrition and maternal smoking[65, 66].

Table 23: Association between malnutrition and maternal smoking

	Never n=234 (%)	Other* n=22 (%)	p-value
Underweight	7 (3)	0	0.411
Stunted	39 (16.7)	7 (31.8)	0.096
Wasted	20 (9.5)	1 (4.5)	0.550
Overweight or obese	54 (23.1)	4 (18.2)	0.344

*Other: always, sometimes or rarely.

4.5 Relationship Between Living Factors and Malnutrition Among Under-Five Children

4.5.1 Malnutrition and Monthly Income:

None of these associations were significant.

- Underweight: Children who have households with higher income were significantly less likely to be underweight, this agree with couple of studies showing the same results[21, 24].
- Stunting: Our findings agree with some studies that showed a significant association between stunting and being in a low-income family[15, 33].
- Wasting: Our results showed that most of wasted children belonged to low monthly income families, this agree with other studies we reached in the literature[33, 44].
- Overweight or obesity: The majority of the overnourished children belonged to families with low-income, this result is compatible with a study having the same findings[40].

Table 24: Association between malnutrition and monthly income

	High income* n=82 (%)	Low-income** n=174 (%)	p-value
Underweight	0	7 (4)	0.066
Stunted	12 (14.6)	34 (19.5)	0.340
Wasted	5 (6.1)	16 (9.2)	0.142
Overweight or obese	12 (14.6)	46 (26.4)	0.447

*High income: 4000 TL or more

**Low-income: Less than 4000 TL.

4.5.2 Malnutrition and Household Members:

Most of the articles we reached showed significant association between large family size and under-five malnutrition. But in our sample the majority of the malnourished children were the ones belonging to families consisting of 4 members only. Anyhow, none of these associations were significant.

- Underweight: A study done in Pakistan had a similar findings, were household size were found to have no significant association with children being underweight[24].
- Stunting: Some studies found that no significant relation was found between family size and stunting [32, 33], which agrees with our findings.
- Wasting: The studies showed that one of the risk factors of SAM was large family size (≥5 family members)[9, 18], however our findings were different.
- Overweight or obesity: Children with >4 family members were more overweight or obese. This isn't compatible with another study, which showed children born in a family size of 3-4 persons were more obese in comparison with children born in a family size of 5-6 persons or more[62].

Table 25: Association between malnutrition and number of household members

	3 members n=51 (%)	4 members n=120 (%)	>4 members n=85 (%)	p-value
Underweight	1 (2)	4 (3.3)	2 (2.4)	0.851
Stunted	7 (13.7)	21 (17.5)	18 (21.2)	0.581
Wasted	2 (3.9)	12 (10)	7 (8.2)	0.457
Overweight or obese	8 (15.7)	26 (21.7)	24 (28.2)	0.152

4.5.3 Malnutrition and Number of Siblings:

Regardless that none of the associations we had between children malnutrition and number of siblings were significant, the majority of the malnourished children in our sample were the ones having 1 sibling (114), followed by those who don't have any sibling (42), and the least are the ones with ≥2 siblings.

- Underweight: We had different result from what we found in the literature, where in the literature prevalence of underweight was found to be significantly higher in those with more siblings[34].

- Stunting: Most of the stunted children were the ones with ≥2 siblings, this agree with a study where having ≥2 siblings was associated with children stunting [41].
- Wasting: We had different result from what we found in the literature where in the literature the prevalence of wasting was found to be significantly higher in those with more siblings[41].
- Overweight or obesity: A study found that decreasing number of siblings as having no siblings increased odds of overweight[58], this was different from our findings.

Table 26: Association between malnutrition and number of siblings

	No siblings n=62 (%)	1 sibling n=154 (%)	≥2 siblings n=40 (%)	p-value
Underweight	1 (1.6)	6 (3.9)	0	0.333
Stunted	10 (16.1)	28 (18.2)	8 (20)	0.837
Wasted	3 (4.8)	17 (11)	1 (2.5)	0.116
Overweight or obese	12 (19.4)	36 (23.4)	10 (25)	0.347

4.5.4 Malnutrition and Child Exposure to SHS At Home:

The number of children who were never exposed to SHS at home (96) was slightly more from the number of the children who were frequently exposed to SHS (85), anyway we didn't find any significant association. Regardless to this, we can't deny that child exposure to SHS have negative effect on their nutritional status [69, 70].

Table 27: Association between malnutrition and child exposure to SHS at home

	Frequently n=102 (%)	Never n=154 (%)	p-value
Underweight	1 (1)	6 (3.9)	0.161
Stunted	24 (23.5)	22 (14.3)	0.073
Wasted	10 (9.8)	11 (7.1)	0.187
Overweight or obese	30 (29.4)	28 (18.2)	0.260

4.6 Results Discussion

So, we can see the factors affecting malnutrition in our sample as following;

4.6.1 Underweight:

Being male, age 36-47 months, 2nd child, LBW, not exclusively breastfed, started complementary after 6 months, spending 4-9 hrs. daily on smart devices, eating frequently while playing with smart devices, 1-5 cups/daily of sugary drinks, separated/divorced mother, mother age 17-25 yrs., mother smoking during pregnancy (never), mother high educational level, father low educational level, employee mother, father medium-income job, low income, 4 household members, 1 sibling, exposed to SHS at home (never).

4.6.2 Stunting

Being male, age 48-59 months, ≥3rd child, LBW, exclusively breastfed, started complementary after 6 months, not spending time on smart devices, never eating while playing with smart devices, sugary drinks intake (occasionally), married mother, mother age 30-50 yrs., mother smoking during pregnancy (other), mother & father low educational level, employee or student mother, father job (other), low income, >4 household members, ≥2 siblings, exposed to SHS at home (frequently).

4.6.3 Wasting

Being female, age 36-47 months, 1st child, HBW, not exclusively breastfed, started complementary 0-6 months, spending 4-9 hrs. daily on smart devices, eating frequently while playing with smart devices, sugary drinks intake (occasionally), separated/divorced mother, mother age 17-25 yrs., mother smoking during pregnancy (never), mother & father low educational level, employee mother, father low-income job, low income, 4 household members, 1 sibling, exposed to SHS at home (frequently).

4.6.4 Overnutrition

Being male, age 12-23 months, ≥3rd child, HBW, exclusively breastfed, started complementary 0-6 months, spending 1 hr./daily on smart devices, eating rarely while playing with smart devices, 1-5 cups/daily of sugary drinks, separated/divorced mother, mother age 17-25 yrs., mother smoking during pregnancy (never), mother & father low educational level, student mother, father job (other), low income, >4 household members, ≥2 siblings, exposed to SHS at home (frequently).

4.7 Thesis Findings Agreement with the Literature

Variables	Thesis findings agreement with the literature
Child gender	Underweight: Disagree Stunting: Agree Wasting: Agree Overnutrition: Agree
Child age	Underweight: No clear idea Stunting: Agree Wasting: Disagree Overnutrition: Agree
Birth order	Underweight: Disagree Stunting: Agree Wasting: Disagree Overnutrition: Disagree

Birth weight	Underweight: Agree Stunting: Agree Wasting: Disagree Overnutrition: Agree
Exclusively breastfeeding	Underweight: Agree Stunting: Disagree Wasting: Agree Overnutrition: Disagree
Age of starting complementary food	Wasting: Agree Overnutrition: Agree
Daily hours on smart devices	Overnutrition: Disagree
Eating while spending time on smart devices	
Daily sugary drinks intake	Overnutrition: Disagree
Marital status	Underweight: Agree Stunting: Disagree Wasting: No clear idea Overnutrition: No clear idea
Mother age	Underweight: Disagree Stunting: Agree Overnutrition: Agree
Mother education	Underweight: Agree Stunting: Agree Wasting: Agree Overnutrition: Disagree
Father education	Underweight: Agree Stunting: Agree Wasting: Agree Overnutrition: No clear idea
Mother occupation	Underweight: Agree Stunting: Agree Wasting: Agree Overnutrition: No clear idea

Father occupation	Underweight: Agree Stunting: Agree Wasting: Agree Overnutrition: No clear idea
Maternal smoking	Overnutrition: Disagree
Monthly income	Underweight: Agree Stunting: Agree Wasting: Agree Overnutrition: Agree
Household members	Underweight: Disagree Stunting: Agree Wasting: Disagree Overnutrition: Disagree
Number of siblings	Underweight: Disagree Stunting: Agree Wasting: Disagree Overnutrition: Disagree
Exposure to SHS at home	Underweight: Disagree Stunting: Agree Wasting: Agree Overnutrition: Agree

5. CONCLUSION and RECOMMENDATIONS

5.1 Conclusion

Malnutrition is a serious problem affecting human beings on both short and long term.

In our study, 51.6 % of the sample was malnourished, overnutrition was the most common type followed by stunting, wasting and finally underweight, which agree with couple of articles[29, 34, 43]. As we found that overweight or obesity were the highest proportion of our sample, this could be due to the changes that occurred to the world on the last 50 years which effected the lifestyle of the population. These changes are like less physical activity and the high intake of processed and junk food[11]. So, these changes in lifestyle and dietary patterns have been conducted with diet-related chronic diseases such as overweight and obesity[11]. As we find from the literature that many factors are casing this problem. Anyway, in our sample we were able to learn about some of the factors that are associated with malnutrition, but many of these factors didn't come as we expected and were not associated with the malnutrition of our sample. This could be for different reasons, maybe parents are becoming more aware of this problem and trying to avoid it or maybe they didn't give a true answer in the questionnaire or because of the size of our sample.

In addition, we found that some of the common factors that were significant in our study like; mother occupation as having a working mother was significantly associated with underweight.

Also, marital status as mother being separated or divorced was significantly associated with wasting & underweight.

5.2 Recommendations

We conducted this study to understand the nutritional status of these children and take a general idea about the situation, so we may be able to make a change and help in understanding and reducing the number of malnourished children. Now, after all this work, we are able to evaluate the situation and give some recommendations.

1- More studies on children's nutritional habits and status should be held especially for Syrians living in Turkey as there is no enough information about them.

2- Children should have a constant nutritional evaluation twice a year and their situation should be taken in consideration and followed up with a pediatric and nutritionist in the medical healthcare center.

3-Educational seminars and brochures should be conducted to the parents about the most common reasons of children malnutrition and what should they do to prevent this problem.

4- Educational seminars and brochures should be conducted to school students to educate them about this problem and how to prevent it.

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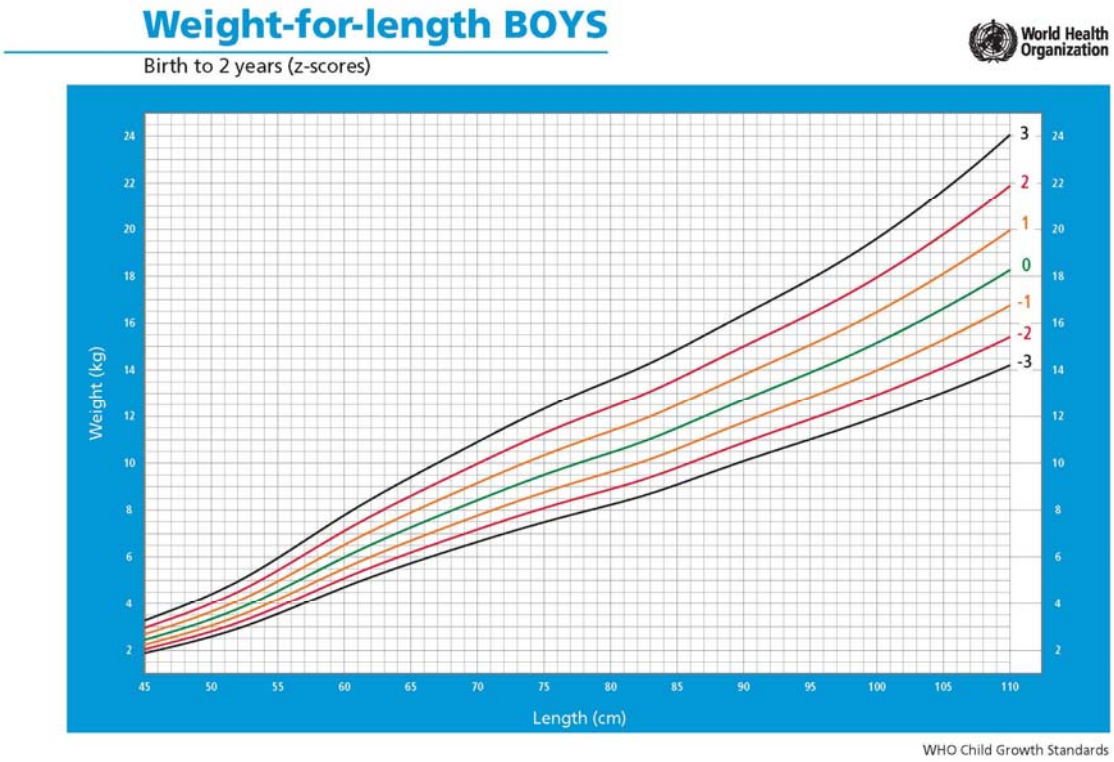
7. APPENDICES

Appendix 1



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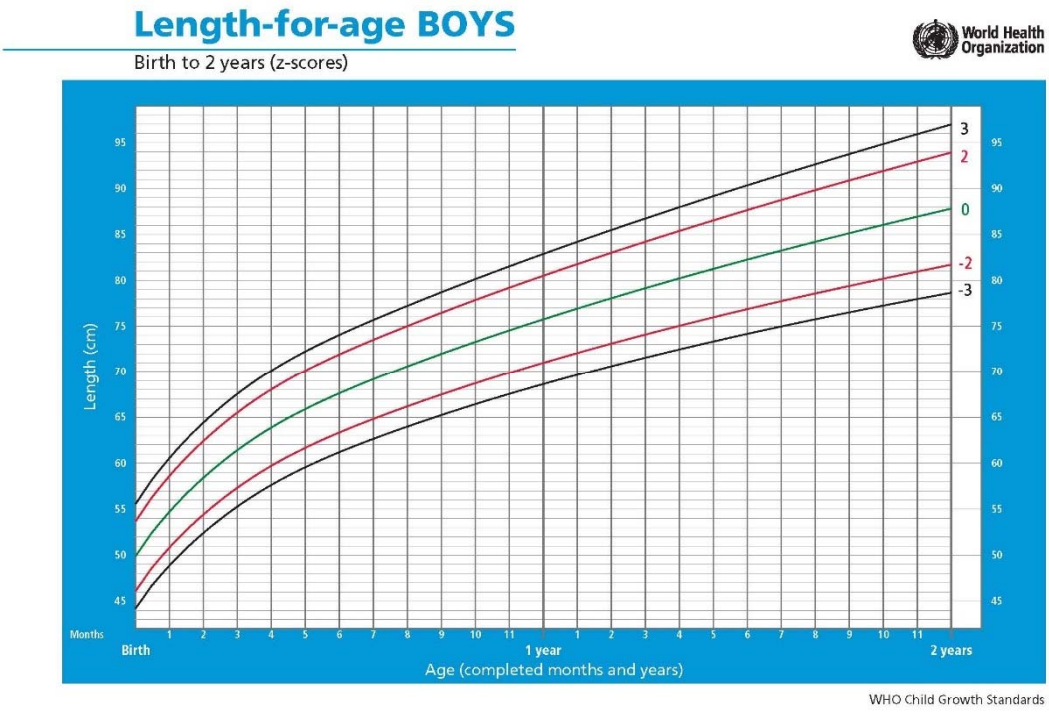

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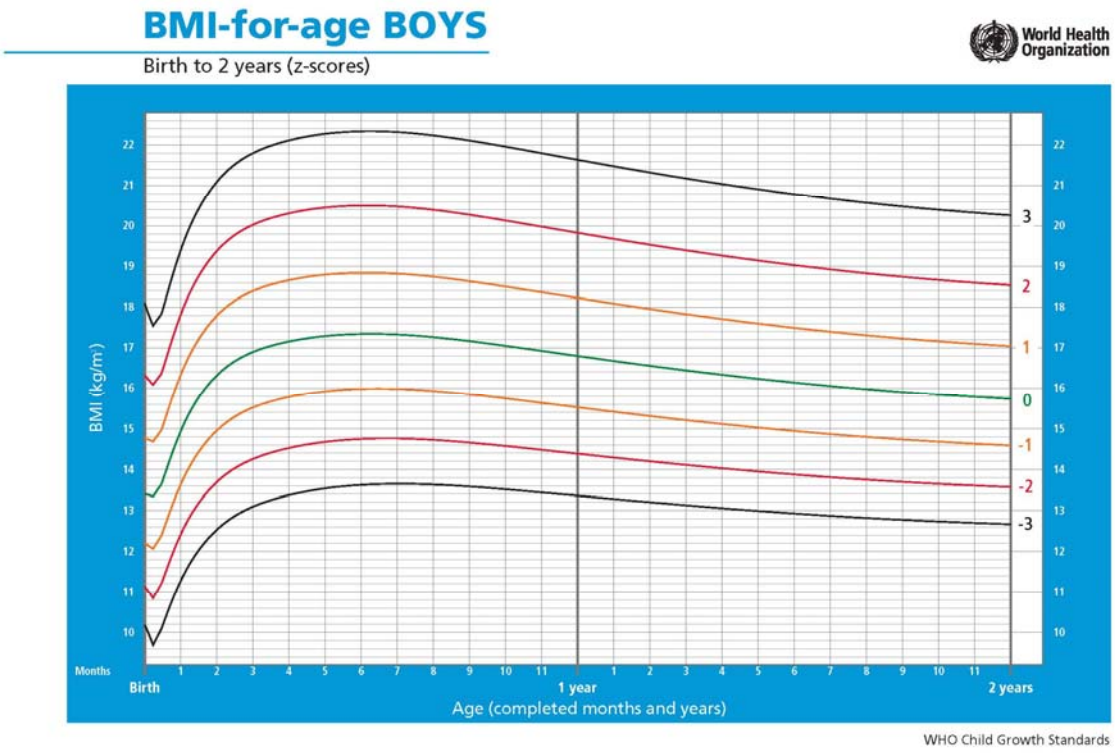

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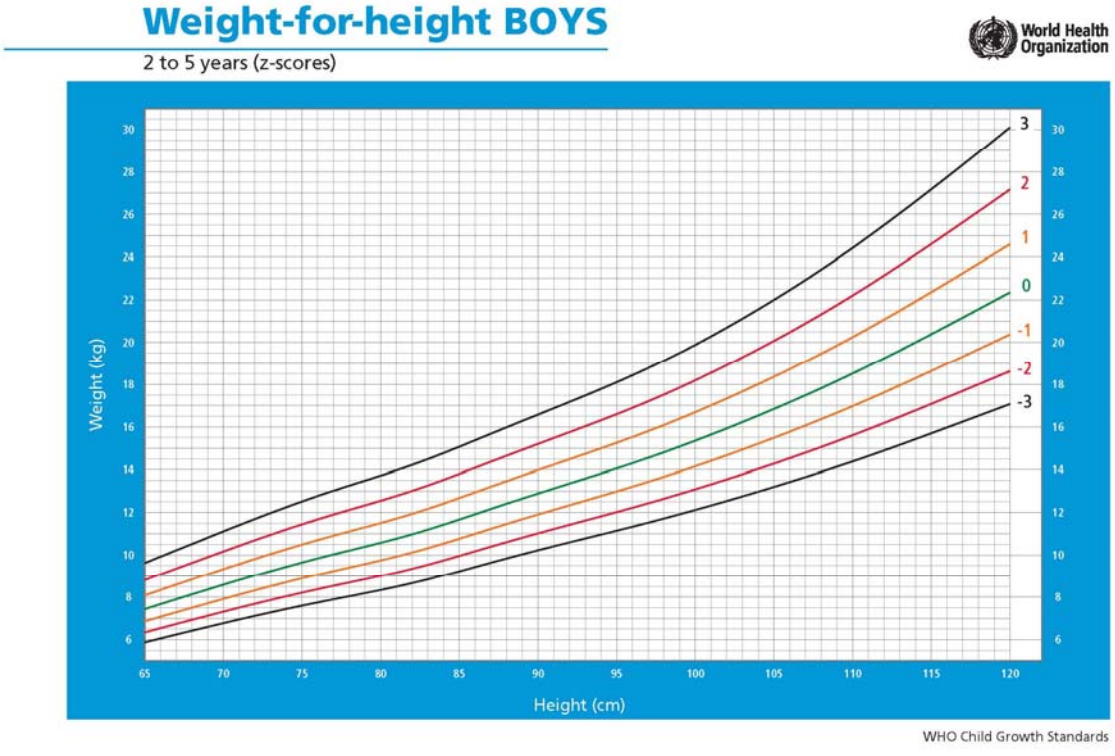

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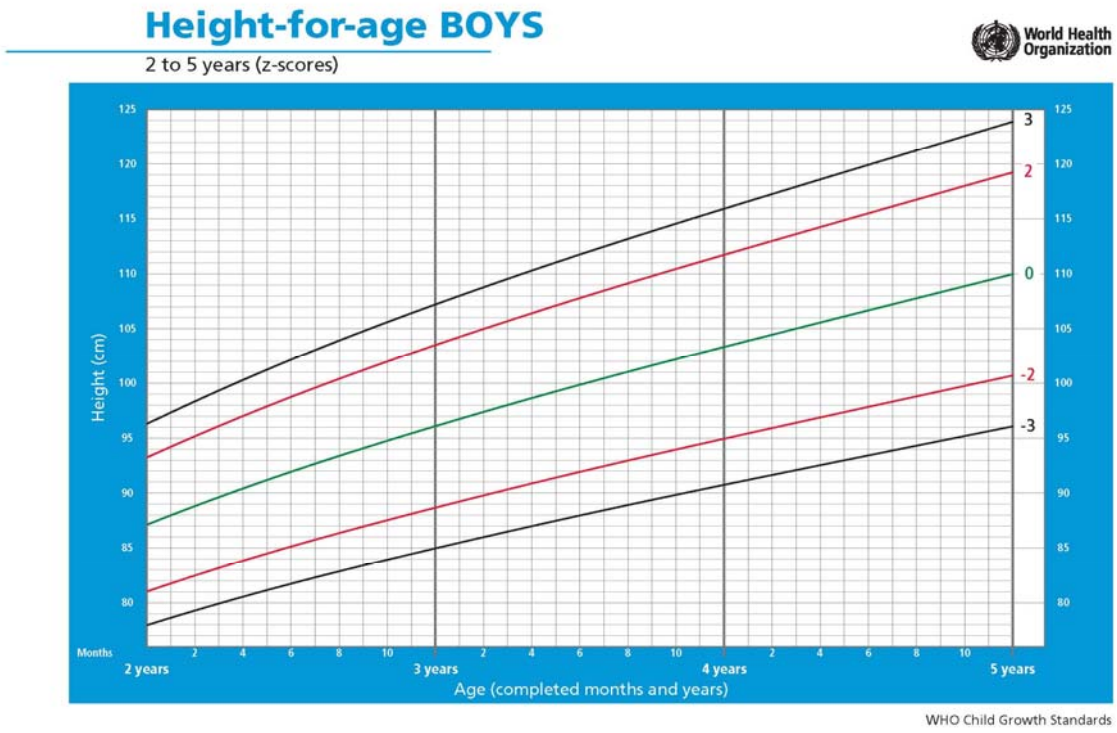

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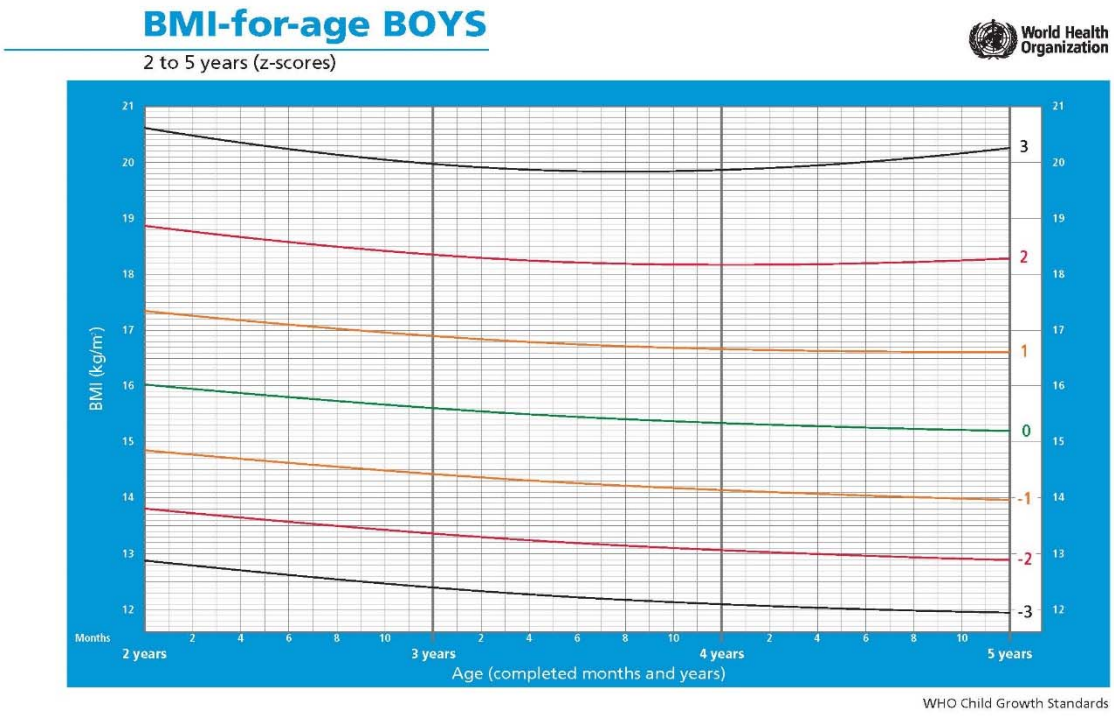

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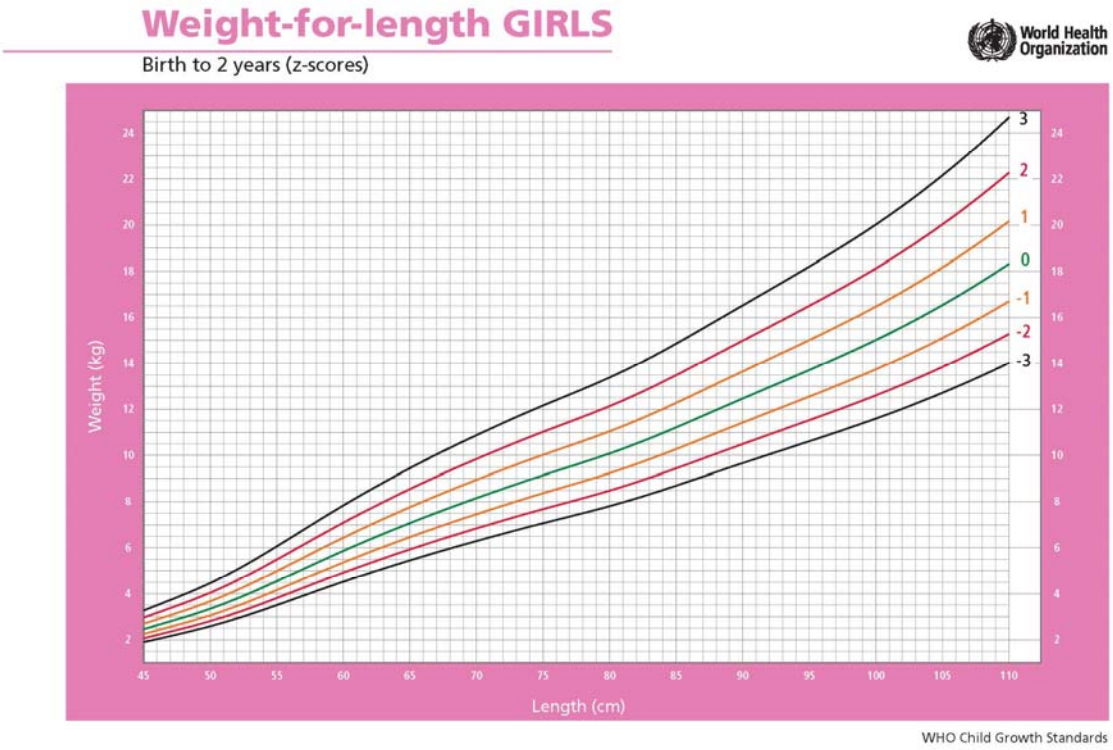
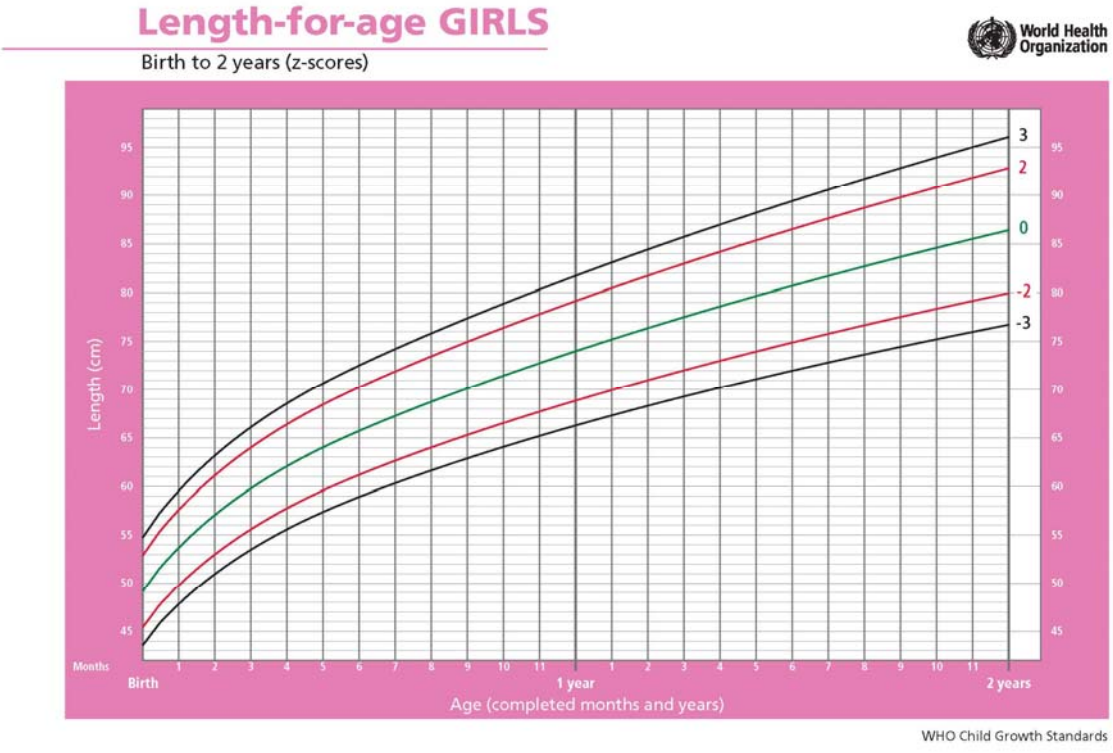


Appendix 8



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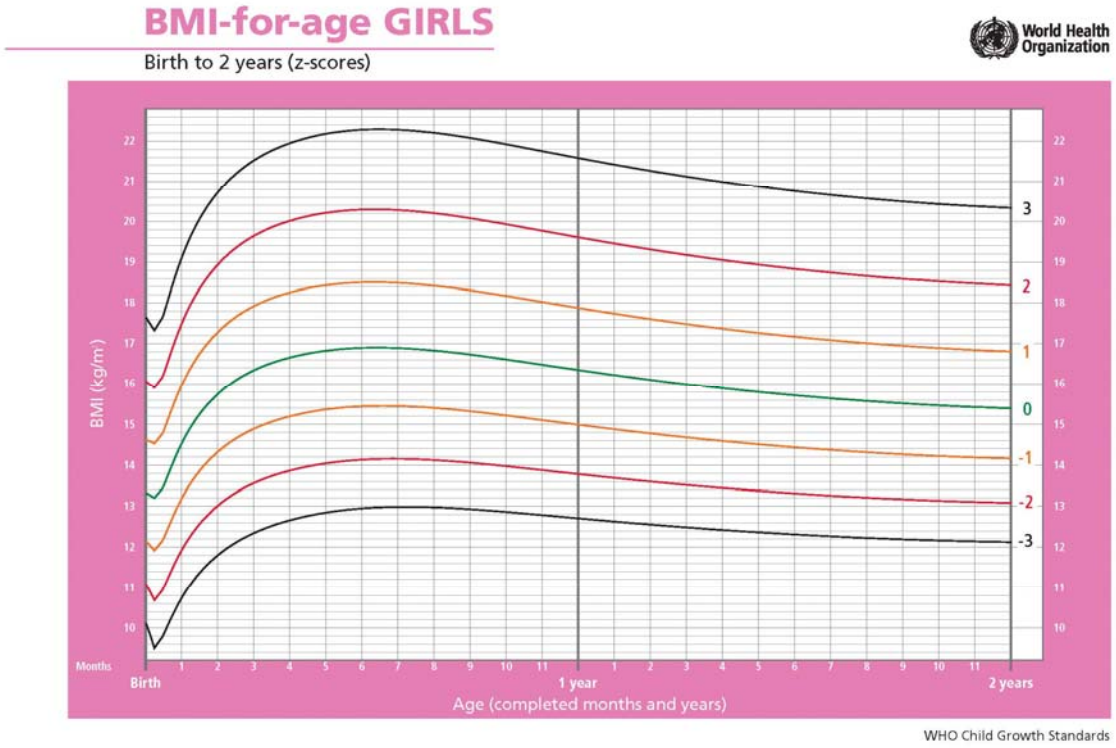
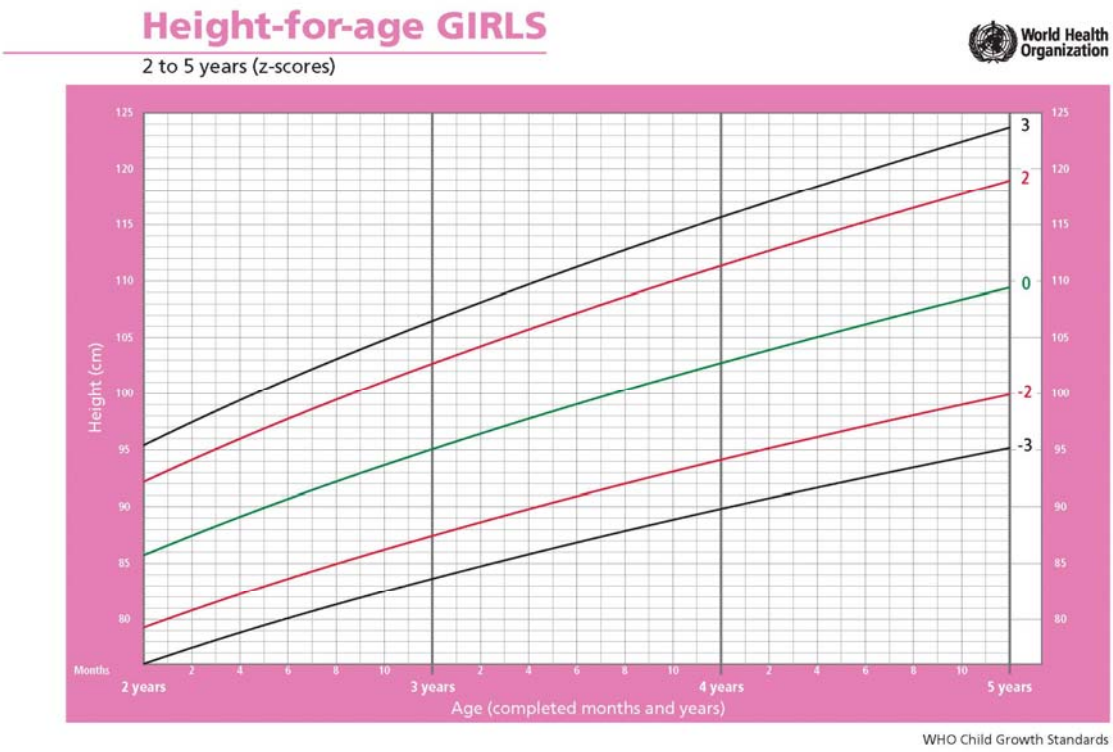


Appendix 10

Appendix 11



Appendix 12