

AMERICAN UNIVERSITY OF BEIRUT

DIETARY PATTERNS AND THEIR ASSOCIATION
WITH OBESITY INDICES AMONG
LEBANESE CHILDREN 2-5 YEAR OLD

by
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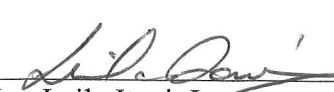
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AN ABSTRACT OF THE THESIS OF

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In The Eastern Mediterranean region obesity is becoming the most frequent nutritional disorder among children. The present study aims to determine the dietary pattern and their association with socio-demographic and lifestyle factors and BMI among Lebanese children aged 2-5 year old.

A cross-sectional study was conducted on a nationally representative sample (n=531) of 2-5 year old children and their mothers. Subjects were recruited from randomly selected households based on stratified cluster sampling from the six governorates of Lebanon. Socio-demographic, lifestyle, dietary and anthropometric data were collected. Overweight and obesity were defined according to WHO 2007 growth standards.

Using factor analysis two dietary patterns were identified: the “Sweet pattern” and the “Lebanese” pattern. The sweet pattern was characterized by high intake on sweetened beverages, Fast food, Salty snack, sweetened dairy and desserts, condiments, added fats and oil, animal protein, tea and pizza and pie. The Lebanese pattern was characterized by high intake of bread, rice and pasta, dairy products, tea, fruits and vegetables, starchy vegetables and legumes, yogurt, added fat and oil and nuts and seeds.

Children belonging to the third tertile of the Lebanese pattern were found to have 70% lower risk (OR=0.30, CI=0.90-0.98) of being overweight and obese when adjusted for age, sex and other socio-demographic and lifestyle factors.

These findings are in accordance with the literature review suggesting that the Lebanese dietary pattern is protective against obesity. No association was found between the sweet pattern and risk of obesity.

CONTENTS

	Page
ACKNOWLEDGMENTS	v
ABSTRACT.....	vi
LIST OF TABLES.....	x
Chapter	
I. LITERATURE REVIEW	1
A. Prevalence Obesity among Preschool Children.....	1
1. The United State	1
2. Europe	2
3. Africa and Asia.....	2
4. Eastern Mediterranean and Middle East Region.....	2
5. Lebanon	3
B. Definition and Assessment of Obesity among Children	4
1. World Health Organization (WHO) 1995 Reference	5
2. Center for Disease Control and Prevention (CDC) Reference (2000)	5
3. International Obesity Task Force Reference (IOTF).....	6
4. World Health Organization (WHO) 2007 Reference	6
C. Consequence of Childhood Overweight and Obesity.....	7
D. Risk Factor for Overweight and Obesity in Children.....	8
1. Genetics Factor and Family History of Obesity	8
2. Socio-Economic Status.....	10
3. Dietary Habits Practices	11
a. Breakfast Skipping	11
4. Snacking	11
5. TV Viewing	12
6. Infant Feeding Practice.....	13
7. Dietary Factors	14
8. Energy Intake.....	14
9. Fat.....	15

10. Carbohydrate Intake	15
11. Protein Intake	16
12. Food Groups	17
13. Fruits and Vegetables.....	18
14. Dairy Products	18
15. Sugar Sweetened Beverages.....	19
16. Dietary Pattern: The New Approach	20
a. Advantages of Dietary Pattern Approach	20
b. Methods for Defining Dietary Patterns	21
c. Dietary Pattern and Its Association with Obesity and Disease	22
d. Dietary Pattern among Children and Socio- Demographics and Lifestyle Correlation.....	23
II. MATERIALS AND METHODS	26
A. Study Design	26
B. Ethics	28
C. Survey Instrument.....	28
D. Anthropometric Measurements	29
1. Mothers.....	29
2. Children	30
E. Dietary Intake Assessment (24 Hour Recall Data).....	31
F. Statistical Analysis	32
G. Dietary Patterns Derivation	33
H. Statistical Analysis	35
I. List of Variables Used in the Analysis	36
III. RESULTS	41
A. Descriptive Data	41
1. Socio-Demographics and Lifestyle	41
2. Dietary Pattern Extracted by Factor Loading.....	45
3. Correlation between Dietary Patterns and Energy Intake and Energy Adjusted Nutrients.....	46
4. Determinants of Dietary Patterns (Multivariate Linear Regression)	47
5. Adherence to Dietary Pattern and Odds Of Obesity	49

IV. DISCUSSION.....	50
A. Dietary Patterns	50
B. Correlation between Dietary Pattern and Energy Intake and Energy Adjusted Nutrients	53
C. Determinants of Dietary Pattern	55
D. Adherence to Dietary Pattern and Odds of Obesity	58
E. Strength and Limitations	60
V. CONCLUSIONS AND RECOMMENDATIONS	62
Appendix	
I. ARABIC QUESTIONNAIRE.....	63
II. CONSENT FORM	93
REFERENCES	99

TABLES

Table	Page
1. Geographical distribution of the study sample in ELNAHL project, assuming a sample size of 1030 subjects	27
2. Food groups used in the factors analysis.....	34
3. List of variables used in the analysis	37
4. Socio-demographic and lifestyle characteristics of the study population.....	42
5. Rotated factor loading matrix for the derived dietary patterns	45
6. Pearson's correlation Coefficients of the association between dietary pattern score with energy adjusted nutrients	46
7. Correlates of the identified dietary patterns in the study population as assessed by multivariate linear regression	47
8. Odds of overweight and obesity across tertiles of dietary patterns scores.....	49

*To My
Beloved Parents*

CHAPTER I

LITERATURE REVIEW

A. Prevalence Obesity among Preschool Children

A marked increase in the prevalence of childhood obesity has been observed worldwide in recent decades, with children manifesting obesity at progressively younger age (Shashaj *et al.* 2014). In 2010, de Onis, Blossner and Borghi estimated that the worldwide prevalence of childhood overweight and obesity for children younger than 5, increased from 4.2% in 1990 to 6.7% in 2010 which is an alarming increase of 60%. If this trend continues the number is estimated to reach 9.1% by 2020 (de Onis, Blossner and Borghi 2010). The study also showed that developed and developing countries followed a similar pattern of increased prevalence of overweight and obesity in preschool children, 11.7% and 6.1%, respectively. However, the relative percent of change in developing countries is greater (65% vs 48% from 1990-2010).

1. The United State

The rate of childhood obesity has increased at a rapid rate since the 1960s as shown by data provided by NHANES (Fryar, Carroll and Ogden 2012). Among preschool children aged 2–5 years, obesity increased from 5.0% to 12.1% between 1976–1980 and 2009–2010 (Fryar, Carroll and Ogden 2012). In 2011-2012, the prevalence of obesity was estimated to over 8% in the same age group (Ogden, Carroll, Kit and Flegal 2014). Although the prevalence of obesity in this age group remains high, it has leveled off when compared to last data collected in 2009-2010. This can be explained by the increased focus of many public health efforts in the United States

(Ogden *et al.* 2014).

2. Europe

A number of studies have examined the trends in childhood obesity in European countries. These data suggest that childhood obesity has increased steadily in this region over the past two to three decades; but data on overweight and obesity in pre-school children are scarce and their interpretation is difficult (Cattaneo *et al.* 2010; Lobstein, Baur and Uauy 2004). Based on a recent meta-analysis from 27 countries of the European Union, the countries in the Mediterranean region and British islands report the highest rates of overweight and obesity in pre-school children. While countries in middle, eastern and northern Europe reports the lowest; with Spain ranking highest in prevalence of overweight and obesity (32.3%) among 4 years old children using IOFT reference, and Romania reported the lowest prevalence (11.8%) (Cattaneo *et al.* 2010).

3. Africa and Asia

In Africa the prevalence of overweight and obesity among preschool children was estimated in 2010 to be 8.5% and it is expected to reach 12.7% by 2020. In Asia the estimated prevalence is lower than Africa (4.9% in 2010). However in absolute numbers, Asia has higher number of overweight and obese preschool children. Of all sub regions in 2010, North Africa has the highest prevalence (17%) which is driven mainly by Egypt (20.5% in 2008) and Libya (22.4% in 2007) (de Onis *et al.* 2010).

4. Eastern Mediterranean and Middle East Region

Although research on over nutrition among preschool children in the Arab world is scarce, available data suggest that the rate of overweight and obesity in

children younger than 5 years are similar to rates reported in developed countries. The prevalence of obesity in children younger than 5 years in Arab countries ranges between 6.5% and 9.9% (Rahim *et al.* 2014). Among Saudi preschoolers (1-6 year old) prevalence of overweight and obesity in boys was 10.7% and 6.0%, respectively, while in girls, it was reported to be 12.7% and 6.74%, respectively. Among 1-18 years old Saudi children, obesity prevalence was highest in the 2-3 year old category, where 16.4% boys and 13.7% girls were obese (El-Hazmi and Warsy 2002).

In Kuwait, obesity is considered to be the most frequent nutritional disorder among preschool children. Al-Qaoud and Prakash found that 8 % of Kuwaiti preschool children were overweight and 12.1% were obese (Al-Qaoud and Prakash 2009). In Bahrain, prevalence of overweight and obesity among children aged 2-5 was 12.3% (8.4% in Girls and 7.2 % in boys) using WHO cut-off values (Al-Raees, Al-Amer, Musaiger and D'Souza 2009). Similarly, in Birjand, Iran overweight was found to be 10.6% (11.7% in girls and 9.6% in males) and obesity 7.6% (6.3% in females and 9.6% in males) (Fatemeh *et al.* 2012).

5. Lebanon

Data on the prevalence of obesity among preschool aged children are limited in Lebanon. A study conducted in 2003 on 3-9 year old children showed that 16.7% were overweight and 4.8 % were obese (Sibai, Hwalla, Adra and Rahal 2003). Recent data on 6-19 year old Lebanese children show an upward trend in Childhood obesity; were comparing data from 1997-2009 showed an approximate two-fold increase in prevalence of obesity (Nasreddine, Naja, Akl, Chamieh, Karam, Sibai and Hwalla 2014). These findings highlight the need for further studies to investigate obesity among children and preschoolers in Lebanon.

B. Definition and Assessment of Obesity among Children

Childhood overweight and obesity has reached epidemic level worldwide.

Obesity result from imbalance between energy intake and energy expenditure and can be defined as excess body fat. It has both short- and long term association with morbid outcomes (Daniels *et al.* 2005; Dehghan, Akhtar-Danesh and Merchant 2005).

Different methods can be used to assess overweight and obesity in children including direct and indirect methods.

Direct measures of body fat provide estimation of total body fat mass and various components of fat free mass (Lobstein *et al.* 2004). These techniques include under water weighing, magnetic resonance imaging (MRI) and dual energy X-ray absorptiometry (DEXA) (Lobstein *et al.* 2004). Indirect methods uses anthropometric measurements to assess adiposity in clinical, research and surveillance setting because they require less expense and expertise than the direct methods which its use is restricted mostly for research purposes. The most widely used indirect methods for the assessment of obesity in children include body mass index (BMI), waist circumference and skin fold thickness (Barreira *et al.* 2012; Lobstein *et al.* 2004).

BMI is defined as weight over height squared (kg/m^2). It is widely used as an index of body fatness in children, adolescent and adults and considered the most convenient way of measuring relative adiposity. Unlike the BMI cut-off point in adults which have clear cut of points; adults with BMI greater than $25 \text{ kg}/\text{m}^2$ are considered overweight and those with BMI greater than $30 \text{ kg}/\text{m}^2$ are considered obese: BMI in children and adolescence varies with age and gender and several different references for classifications exist (Jackson, Rashed, Al-Hamad, Hwalla and Al-Somaie 2007; Lobstein *et al.* 2004). The major growth charts developed to asses overweight and obesity in children are listed below.

1. World Health Organization (WHO) 1995 Reference standards

The WHO in 1995 developed recommendations for the proper use and interpretation of anthropometric indicators in individuals and populations (World Health Organization 1995). For children under the age of 9 years, weight-for-height Z scores were recommended. Hence, children with weight-for-height Z-score >1 are classified as overweight and those with Z-score >2 are classified as obese. For children greater than 9 years old, BMI-for age percentiles were recommended (World Health Organization 1995) based on data from Must, Dallal and Dietz (1991). Must *et al.* (1991) uses the data from NHANES I to calculate BMI percentiles for individuals aged 6-74 years. Based on that data, children and adolescents with BMI ≥ 85 th percentiles are classified as overweight and those with BMI ≥ 95 th percentile as obese (Must *et al.* 1991).

2. Center for Disease Control and Prevention (CDC) Reference (2000)

In 2000 the CDC released growth charts from birth to 20 year of age. The growth charts were based on U.S national data collected from 5 representative surveys performed between 1963 and 1994 (NHANES I, II, III and NHES II and III) (de Onis, Garza, Onyango and Borghi 2007). Based on that, children aged 2-20 years old with BMI between 85th and 95th percentile are classified as at risk of overweight and those with BMI greater or equal to 95th percentile are classified as overweight. However some organizations such as the Institute of Medicine and the American Academy of Pediatrics, chooses to call children with BMI equal to 95th percentile or greater as Obese rather than overweight in order to stress on the seriousness of childhood obesity (Koplan, Liverman and Kraak 2005; Krebs *et al.* 2007). After the development of the IOTF and the WHO 2007 cutoffs, studies outside the US do not use the CDC 2000 reference anymore except for comparative purposes (Himes 2009).

3. International Obesity Task Force Reference (IOTF)

The IOTF was developed from BMI data collected from six different nationally representative surveys of growth from Great Britain, Brazil, Hong Kong, Singapore, the Netherlands and the U.S and therefore it is often used in epidemiological research for comparative purposes among different populations (Cole, Bellizzi, Flegal and Dietz 2000). Cole *et al.* (2000) define overweight and obesity in children aged 2-18 years through developing age and gender specific BMI cutoff values that correspond to the adults' cutoff values 25kg/m^2 (overweight) and 30kg/m^2 (obese) at 18 years of age.

4. World Health Organization (WHO) 2007 Reference

Previous recommendations by WHO had drawbacks such as it started only at age of 9 year and covered a narrow BMI distribution range (5th to 95th percentile) (de Onis *et al.* 2007). Therefore, in 2006, the WHO released new growth standards for the assessment of weight, height and BMI for age for children 0-5 year of age (de Onis, Onyango, Borghi, Garza and Yang 2006).

The WHO Multicenter Growth reference study (MGRS) was a population-based study done between 1997-2003 in several countries including Ghana, Brazil, Norway, Oman, India, and the USA. Data from this study was combined with the 1977 NCHS/WHO growth references, to develop the new WHO growth standards (de Onis *et al.* 2006). The WHO now classifies overweight as a BMI z-score of greater than 2SD that is equal to a BMI of 25 kg/m^2 at 19 year old and obese as a BMI z-score of greater than 3SD which is equal to BMI of 30 kg/m^2 at the age of 19 (de Onis *et al.* 2007).

The alarming increase in childhood obesity has become the focus of many public health efforts because evidence show that overweight and obese children are more likely to be overweight and obese in adulthood than lean children (Shashaj *et al.*

2014).

C. Consequence of Childhood Overweight and Obesity

It has been shown that childhood obesity increases the likelihood of adulthood obesity in several studies (Daniels *et al.* 2005; Freedman *et al.* 2005; Lobstein *et al.* 2004). Freedman *et al.* (2005) reported that BMI of 2-5 year old children who were overweight were more than 4 times likely to become over fat adults than other children in the normal BMI range. In addition to the increased risk of becoming an overweight adult and the know comorbidities that accompany it, childhood overweight and obesity experience similar detrimental effect as overweight and obese adults, these complications are not only physical but also psychological. The Bogalus Heart Study found that almost 50% of children who were overweight at 5 to 10 years had cardiovascular risk factors such as high BP, dyslipidemia, or elevated insulin level (Daniels *et al.* 2005). Furthermore, in a cohort study, it was found that despite short-term exposure to excess weight; metabolic abnormalities such as hypertension, dyslipidemia, insulin resistance and nonalcoholic fatty liver disease were detectable in preschool children (2-6 year old) at the onset of overweight and obesity (Shashaj *et al.* 2014). Even type 2 diabetes, which previously was only seen in adults, has been on the rise in obese children. The onset of Diabetes in youth will increase the risk in early adulthood of the advanced complications that accompany this disease (Lobstein *et al.* 2004). Childhood obesity is associated with psychological and social consequences. Elevated BMI has been positively linked to depression in children. Overweight and obesity in children has been associated with increased psychosocial difficulties such as decreased peer relationships. In addition to fewer friends, being teased about weight is another cause of increased psychosocial distress (Daniels *et al.* 2005). Obese youth has

been associated with becoming an adult with lower educational attainment, earning less money, experiencing higher rate of poverty (Lobstein *et al.* 2004). The cause of obesity is due to several factors that can be classified into 2 parts; Genetic and Environmental. Knowing the causes might help in the intervention to decrease incidence and prevalence of childhood obesity.

D. Risk Factor for Overweight and Obesity in Children

Environmental causes of obesity are complex, but at macroscopic level it is known that obesity occurs when energy intake exceeds energy expenditure. There are multiple causes of this imbalance and therefore the rise in obesity that has been seen cannot be addressed by a single etiology. It suggests that behavior and environmental factors play a major role in the modification of the balance between energy intake and expenditure (Dehghan *et al.* 2005; Ebbeling, Pawlak and Ludwig 2002). However, not all individuals become obese, which suggests that some people have higher risks of becoming obese in an environment that stimulates it (Li, Law, Lo Conte and Power 2009). In order to understand the cause of obesity one has to look at genetic, environmental and behavioral aspects associated with childhood obesity.

1. Genetics Factor and Family History of Obesity

There is abundance of evidence for a strong genetic component in the determination of body composition in young children (Stunkard, Harris, Pedersen and McClearn 1990). Studies in twins, non-twin siblings and adoptees have shown that genetics contribute from 40%-70% to the inter-individual variation in obesity (Maes, Neale and Eaves 1997). However, findings from genome-wide-association studies (GWAS) explain a very few of the inheritance of obesity. GWAS data has found over

42 genes that are likely associated with obesity. Unfortunately these genes explain only a small proportion of the inter-individual variability in BMI (Manco and Dallapiccola 2012). There is still a large gap between the evidence for genetic regulation of weight and actual identified genes (Sabin, Kao, Juonala, Baur and Wake 2015). Evolving research on non-genetic determinants, mainly epigenetics, suggests environmental factors may influence the expression of some key weight-regulating genes (Kuehnen *et al.* 2012),

Looking at parent-offspring association, it is clear that parent obesity is a strong determinant of offspring obesity. It has even been shown that offspring fatness increase linearly with parent fatness. It is suggested that the parent-offspring BMI association are due to genetic cause because genetic variants linked to obesity was observed in both. Available evidence suggests that this association is stronger for mothers than fathers (Parsons, Power and Manor 2001; Whitaker 2004). Several cross-sectional studies showed that an obese mother was more likely to have an obese child. Obesity was present in almost 1 in 4 preschoolers who were born to an obese mother compared to less than 1 in 10 of children born to a normal weight mothers (Whitaker 2004). This association between overweight mothers and overweight children was also seen in Lebanon (Jabre, Sikias, Khater-Menassa, Baddoura and Awada 2005). However the rapid increase in obesity worldwide in recent decades is likely caused by changes in environmental factors, because genetic make up of people around the world cannot have changed that drastically (Ebbeling *et al.* 2002; Li *et al.* 2009). Since parent-offspring share common environmental factors, such as socioeconomic, diet, physical activity and other behavioral factors (eg snacking or skipping breakfast) it is suggested that genetic as well as shared environmental factors influence child obesity (Li *et al.* 2009).

2. Socio-Economic Status

Several studies published in different countries, suggests that SES affects peoples risk of developing obesity, in both adults and children (McLaren 2007; Wang and Lim 2012). In general, studies show that obesity is related to SES; however, the association varies with gender, age, and country. SES may affect lifestyle and populations access to food and as a result, influence their energy balance (Wang and Lim 2012). There are several ways that can be used to evaluate the SES such as, the income, location (rural vs. urban), the crowding index (high CI associated with low SES), the educational levels and working status of parents (Melki *et al.* 2004).

Studies has shown that low-SES groups in developed countries and high-SES groups in developing countries are at a higher risk than their counterparts (Chen, Modin, Ji and Hjern 2011; Murasko 2011). Studies from the Middle East showed that obesity is more common in children living in urban areas and among those with higher SES (Chakar and Salameh 2006; Musaiger 2011). When comparing high SES and low SES in Lebanon and Syria Nasreddine, Mehio-Sibai, Mrayati, Adra and Hwalla (2010) found that obesity is more common among those with high SES. This could be explained by the adaptation of Western unhealthy dietary practices among those with higher SES in developing countries (Ebbeling *et al.* 2002). It has also been shown that the increase in working hours among mothers of high SES was linked to increase in overweight among those children (Anderson, Butcher and Levine 2003).

Studies on the link between SES and childhood obesity are still inconclusive, therefor more studies should be done. Furthermore, in addition to looking at the socio-economic criteria for childhood overweight and obesity, it might be important to look at dietary habits and practices such as breakfast skipping and snacking

3. Dietary Habits Practices

Alongside the increase in obesity that has been seen in the past few decades, there have been changes in dietary practices that may be linked to obesity such increase in eating out and snacking (Newby 2007; Nicklas, Myers, Reger, Beech and Berenson 1998).

a. Breakfast Skipping

Breakfast eating has been proposed to be linked to a healthy bodyweight (Dubois, Girard, Potvin Kent, Farmer and Tatone-Tokuda 2009). Numerous studies show a positive association between breakfast skipping and increased risk of overweight and obesity in children (Dubois, Girard and Kent 2006; Dubois *et al.* 2009; Tin, Ho, Mak, Wan and Lam 2011). Possible mechanisms that mediate the link between breakfast skipping and increase in weight is the subsequent increase in intake of high-energy snacks, decrease in healthy food consumption and larger meal portions for the rest of the day (Dubois *et al.* 2009; Lobstein *et al.* 2004; Newby 2007). However the association between breakfast skipping and childhood obesity is not always consistent. For instance in the Bogalus heart study no link was found between skipping breakfast and increased risk of overweight or obesity (Nicklas *et al.* 1998) and Stralen *et al.* (2012) found no significant association between breakfast consumption and WC and BMI.

4. Snacking

Snacking can be defined as eating between meals and mostly consist of high-fat, energy-dense, salty, or sweet foods (Musaiger 2011; Patro and Szajewska 2010). However, there is no clear universal definition of “snack” and therefore it varies in

different studies (Musaiger 2011; Patro and Szajewska 2010).

Reports on snacking and its link to overweight and obesity in children are conflicting and inconclusive. The rise of childhood obesity parallels with reported increase in daily snacking, and more frequent snacking has been positively associated with BMI in children (Musaiger 2011). In a study among young children in US snacking, accounted for 27 percent of their daily caloric intake in 2006. A shift toward consuming more salty snacks and candy was reported, but sweetened beverages and desserts remained the major snacking sources (Piernas and Popkin 2010). Lioret *et al.* (2008) showed a significant inverse association between overweight and the contribution to snacking among 3-11 year old French children.

However, according to the ADA, snack food intake is not likely to be associated with adiposity in children (Davies 1997). The lack of consistent definition of what a snack is may be the main cause of the inconsistency seen in the effect of snacking (Patro and Szajewska 2010).

5. TV Viewing

The possible role of increase in sedentary lifestyle in the development in obesity in children has been receiving increased attention, and time spent viewing TV has been linked as a key independent predictor of weight status (Danner 2008; Dennison, Erb and Jenkins 2002; Jones, Fiese and Team 2014; Viner and Cole 2005). The American academy of pediatrics (2013) recommend that parent limit television viewing to no more than 2 hrs per day. Among school age children a dose-response relationship have been seen between the amount of TV viewing and prevalence of obesity (Dennison *et al.* 2002). Viner and Cole in 2005 found that weekend TV viewing in early childhood independently predicted increased adult BMI (Viner and Cole 2005).

Jago *et al.* (2005) in a longitudinal study, found that the hours of TV viewing among 3-4 y-old children were positively associated with BMI, even after controlling for diet and physical activity (Jago, Baranowski, Baranowski, Thompson and Greaves 2005). The proposed mechanism by which TV viewing is linked to increase in BMI includes; replacing time that could be used for physical activity with sedentary activity, being distracted by eating and being a primary source of advertisements for unhealthy food choices (Jones *et al.* 2014).

6. Infant Feeding Practice

Breastfeeding represents the ideal form of feeding for newborns. Several studies have been published on the relation between early infant feeding and later development of obesity in childhood (Dewey 1998; Horta and World Health Organization 2007; Li, Parsons and Power 2003). It's proposed that human milk may be involved in growth and appetite control in the neonatal period and infancy, affecting the programming of energy balance regulation both in childhood and adulthood (Dewey 1998; Rodriguez-Palmero, Koletzko, Kunz and Jensen 1999). Breastfeeding exclusivity and for longer duration lead to lower growth rates during the first year of life, and as a result seem to lower risk of overweight and obesity in preschool children (Dewey 1998). However, Inconsistency exists across the studies on breastfeeding and the short term and long-term obesity risk some show protective effects some show no effect (Li *et al.* 2003). These controversial findings may be due to potentially confounding factors (Li *et al.* 2003). Dietz *et al.* (2001) found a positive association between breastfeeding and prevention of obesity later in life and suggest that breastfeeding may be added as a preventive intervention (Dietz 2001). In a systematic review and meta-analysis for WHO by Horta *et al.* (2007), showed that breastfeeding was associated with 22%

reduced risk of obesity in later life (Horta and World Health Organization 2007). In a recent study in Japan, it was found that exclusive breastfeeding at 6-7 months of age was associated with decreased risk of overweight and obesity, even after adjustment for potential confounders (Yamakawa, Yorifuji, Inoue, Kato and Doi 2013). However, some studies found no effect associated with breastfeeding and childhood obesity (Burke *et al.* 2005; Kwok, Schooling, Lam and Leung 2010; Vafa, Moslehi, Afshari, Hossini and Eshraghian 2012).

7. Dietary Factors

It seems logical to assume that the dietary factors play the major role in the obesity epidemic since it accounts for the energy in, and that increased caloric intake over time would result in weight gain.

8. Energy Intake

Studies on the relationship of energy intake and BMI in children and adolescents have produced confounding results. Some found positive relationship between energy intake and obesity (Elliott *et al.* 2011; Grant, Ferguson, Toafa, Henry and Guthrie 2004; Scaglioni *et al.* 2000), other reported no association (Lagiou and Parava 2008) some even found inverse relationship (Hassapidou, Fotiadou, Maglara and Papadopoulou 2006).

The lack of finding that fatter children have higher reported energy intake maybe due to underreporting of food intake in obese children and adolescent (Bandini, Schoeller, Cyr and Dietz 1990; Maffeis, Pinelli and Schutz 1996). As a result of the contradictive findings several studies investigating the relationship between BMI with energy intake have suggested that macronutrient composition of the diet may play an

important role in childhood obesity (Elliott *et al.* 2011).

9. Fat

Fat, as the most energy dense macronutrient has been accused for many years as the cause of increase in pediatric obesity. However, obesity has been on the rise, despite the fact that cross-sectional and longitudinal studies suggest there has been a decrease in fat consumption among children in the US in the past three decades. Even in UK dietary fat intake among children was found to be within government recommendations (Dehghan *et al.* 2005). On the contrary, several cross sectional studies have reported a positive relationship between fat and degree of adiposity in children (Maffeis *et al.* 1996; Tucker, Seljaas and Hager 1997). McGloin *et al.* (2002) found that subjects in Northern Ireland who consume higher intake of fat were significantly fatter compared to those with low intake of dietary fat. Robert *et al.* (1999) saw an increase in the measurement of skin fold thickness with higher intake of fat among 4 to 7 year old children in Texas. The inconsistency in the findings might be due that the type of fat consumed may play greater role in adiposity than amount of fat (Ebbeling *et al.* 2002). Several studies have reported higher intake of saturated fat among obese children (Gillis, Kennedy, Gillis and Bar-Or 2002; Nasreddine *et al.* 2010). The contradictory findings suggest there is not strong enough evidence that fat intake is the main reason for the ascending trend of childhood obesity (Ebbeling *et al.* 2002).

10. Carbohydrate Intake

As with fat, results on carbohydrates and adiposity in children are contradictory. Several high carb low fat diets emerged and claimed that it had inverse association with overweight and obesity (Newby 2007). In fact, several studies did find

a negative association with BMI in children (Greene-Finestone, Campbell, Evers and Gutmanis 2005; Maillard *et al.* 2000). Skinner *et al.* (2004) reported that a longitudinal carbohydrate intake among 2-8 year old children negatively predicted BMI at 8 year of age (Skinner, Bounds, Carruth, Morris and Ziegler 2004). Some studies even failed to show any associations (Atkin and Davies 2000; Elliott *et al.* 2011; Newby *et al.* 2003). In contrary, other studies showed a positive association between carbohydrate intake and childhood obesity (Ebbeling *et al.* 2002; Newby *et al.* 2003). The possible mechanism explaining the link between carbohydrate intake and adiposity addresses the impact of refined carbohydrates (eg breads, ready-to-eat cereals, soft drinks and biscuits) with high GI on blood sugar level. High GI index food stimulate a faster and higher secretion of insulin, causing a dramatic drop in blood glucose level, in turn this drop in sugar level stimulate hunger and cause over eating (Ludwig 2000). Another important aspect of carbohydrates is their fiber content and the impact of carbohydrates on adiposity depends partly on that. Consumption of fibers was shown to decrease energy intake and enhance satiety (Howarth, Saltzman and Roberts 2001). High intake of fibers among 2-19 year olds showed a decreased risk of overweight (Hanley *et al.* 2000).

11. Protein Intake

Most studies on high protein diet have been done on adults (Paddon-Jones *et al.* 2008; Westerterp-Plantenga, Nieuwenhuizen, Tome, Soenen and Westerterp 2009; Yang, Liu, Yang and Jue 2014). Evidence suggests that protein increases satiety more than fat and CHO, and therefor reduces energy consumption under ad libitum conditions (Westerterp-Plantenga *et al.* 2009). Several mechanisms have been hypothesized to explain the satiating effect of protein. First, it's suggested that high protein diets causes

increase in energy expenditure through increased thermogenesis that in turn is linked to increase in satiety (Paddon-Jones *et al.* 2008; Westerterp-Plantenga *et al.* 2009). Furthermore, high protein diets are associated with increase in secretion of satiating hormone PYY and decrease in secretion of postprandial ghrelin level (hunger stimulating hormone) (Helou, Obeid, Azar and Hwalla 2008; Yang *et al.* 2014). As for the pediatric population, only few studies have been done that examine the association of protein and adiposity. Similarly as fat, and CHO, studies on protein has found confounding results. Several studies have reported an inverse association. For instance, one study found that obese children on a high protein diet lost more weight compared to children on a balanced-macronutrient diet (Figuerola-Colon, von Almen, Franklin, Schuftan and Suskind 1993). Lomenick *et al.* (2009) observed that high protein diet compared to high carb or high fat induced increased secretion of PYY and increased satiety in 7-11 year old children. In another study 5-6 year-old children were provided with two iso-caloric meals one high in protein (47% protein) and one low in protein (12% protein). At an ad-libitum meal, the children consuming high protein meal had less caloric intake than the other children (Araya, Jacqueline Hills, Marcela Alvina, Gloria Vera and Hector (2000). On the contrary some studies found no significant association, (Atkin and Davies 2000; Elliott *et al.* 2011; Grant *et al.* 2004) while other found positive (Azizi, Allahverdian, Mirmiran, Rahmani and Mohammadi 2001; Skinner *et al.* 2004). Therefore, more studies should be done that investigate the role of protein intake and its effect on childhood obesity.

12. Food Groups

Since the food we consume is a mixture of macronutrients, it is important to study the role of individual food groups.

13. Fruits and Vegetables

Fruits and vegetables are generally low in calories due to their high fiber and water content, and may play a role in decreasing total energy intake by increasing satiety and displacing energy-dense food (Krebs *et al.* 2007; Newby 2007). However, studies on fruit and vegetable consumption and adiposity are inconsistent. Some studies showed an inverse association between consumption of fruits and vegetables and obesity in children (Amin, Al-Sultan and Ali 2008; Kelishadi *et al.* 2007) other found no association (Faith, Dennison, Edmunds and Stratton 2006; Hanley *et al.* 2000) and even a positive association were found by Newby *et al.* (2003). Discrepancies in findings may be due to how the vegetables are prepared, which contribute to variation in energy intake, energy density and, macronutrient composition (Newby 2007).

14. Dairy Products

It's suggested that increasing intake of milk or dairy products may lower risk of obesity. However, studies on dairy intake and adiposity among preschoolers are limited (Huh, Rifas-Shiman, Rich-Edwards, Taveras and Gillman 2010). In a prospective cohort study, it was found that cow's milk intake at the age of two (whether full- or low-fat) was not associated with incidence of overweight at age three (Huh *et al.* 2010). A longitudinal study of children's (2-96 month of age) dietary intakes for selected nutrients and servings of dairy products found that a higher mean longitudinal calcium intake (mg/day) and more servings/day of dairy product was associated with lower body weight (Carruth and Skinner 2001). Moore *et al.* (2006) found that low level (below 2 servings per day) of dairy intake in early childhood (3-6 year old) resulted in excess weight gain. However, kids consuming high intake of milk was recommended to consume low fat dairy products. The possible mechanism by which dairy exerts its

potential protective effects is through calcium. Dietary calcium seem to play a critical role in the regulation of energy metabolism, such that the increase in calcium intake causes a decrease in 1.25-dihydroxyvitamin D activity and intracellular calcium influx, leading to decrease in fatty acid synthases transcription in adipocytes and a decreased in insulin secretion by pancreas. In addition, it is suggested bioactive compound in in dairy food augment the effect seen in dietary calcium verses supplements (Huang and McCrory 2005). However, several studies has found no association (Murphy, Douglass, Johnson and Spence 2008; Wiley 2010) or even positive correlation that may be due to increase in energy intake associated with high milk consumption (Wiley 2010).

15. Sugar Sweetened Beverages

It has been proposed that one of the possible causes of the rise in childhood obesity is due in part to the decrease in the consumption of dairy, concurrent with an increase in sweetened beverages (Huang and McCrory 2005; III and Quann 2012). Over the past four decades national data from US for individuals greater than 2 years old showed an increase in sweetened beverage consumption for all age groups (Ludwig, Peterson and Gortmaker 2001). Studies have demonstrated that intake of SSBs are associated with increase in risk of overweight an obesity among children (Dubois, Farmer, Girard and Peterson 2007; Johnson, Mander, Jones, Emmett and Jebb 2007; Ludwig *et al.* 2001). Ludwig *et al.* (2001) found that the odds ratio of becoming obese among children increased 1.6 times for each additional can or glass of sugar- sweetened drink that they consumed every day. Dubois and colleagues reported in a study conducted in Canada that sugar-sweetened beverage consumption between meals more than doubles the odds of being overweight among preschool age children. The possible mechanism behind the proposed positive association between SSBs consumption and

obesity seems to be due to the increase in total energy intake which leads to weight gain (III and Quann 2012). In addition Must *et al.* (2009) SSBs consumption may also promote other unhealthy eating behaviors such as consumption of fast food meals. However, some studies found no association between adiposity and SSBs (Newby *et al.* 2004; O'Connor, Yang and Nicklas 2006).

16. Dietary Pattern: The New Approach

The traditional analysis in nutritional epidemiology examines disease in relation to food groups, single foods, or single nutrient intake (Hu 2002; Khani, Ye, Terry and Wolk 2004). Although this type of analysis has been valuable, it has several limitations. First, people eat a diet consisting of a variety of foods with complex combination of nutrients and therefore it is difficult to investigate the effects of individual dietary component separately (Hu 2002). Second, single nutrient approach does not take into consideration the complicated interaction among nutrients (for example enhanced iron absorption in presence of vitamin C) (Khani *et al.* 2004). Third, consumption of single food is often associated with a certain eating pattern; such as whole grain consumption is inversely associated with meat and positively associated with vegetables, fruits and fish consumption (Khani *et al.* 2004). Studying the association of single food (e.g. whole grains) with a specific disease association may be confounded by the effect of that eating pattern (Jacques and Tucker 2001).

a. Advantages of Dietary Pattern Approach

In order to overcome limitations of the conventional approach, nutritional epidemiologists suggest the use of dietary pattern as a different approach to evaluate diet-disease relation, since this approach takes to consideration the total effect of multiple

foods (Khani *et al.* 2004). Heidemann *et al.* (2005) defines dietary pattern as “a comprehensive variable of several foods or food groups that takes into consideration the interactions and cumulative effects of dietary components on a disease risk” (Heidemann *et al.* 2005). The use of dietary pattern as an exposure in disease would resemble more closely the real world, were food, nutrients and non-nutrients are consumed in combination, and their additive effect may be best studied by considering the entire eating pattern (Hu 2002).

At a public health level, recommending a dietary pattern rather than specific nutrients might make it much easier for people to interpret and apply to their lifestyle habit. Success has been seen in for example the DASH diet (Dietary Approach to Stop Hypertension) as it names implies, it’s a dietary pattern that helps lower blood pressure (Hu 2002).

b. Methods for Defining Dietary Patterns

There are several methods for the derivation of dietary patterns such as Factor analysis, cluster analysis and dietary indices. Factor analysis is a statistical technique that characterizes dietary pattern using data collected from dietary information such as food frequency questionnaire or dietary records. Food groups are aggregated based on food they are correlated with in the collected data. Then a summary score is assigned for each pattern and can be used in either correlation or regression analysis to examine relationships between various eating patterns and the outcome of interest, such as overweight and obesity (Hu 2002).

Cluster analysis, is also a statistical technique used to identify dietary patterns, however, it aggregates individuals with similar diets into clusters. Then the clusters are compared across each other to identify certain patterns (Hu 2002).

Factor analysis and cluster analysis both are an “a posteriori” approach, since food pattern are identified once the dietary data are collected. However, the dietary index approach is an “a priori” approach, because they are created based on previous nutritional knowledge (Hu 2002). The healthy eating index (HEI) is an example of a dietary index used to measure the degree to which an individual’s diet abiding to the recommendations of the US Dietary Guidelines for Americans (Hu 2002).

c. Dietary Pattern and Its Association with Obesity and Disease

Dietary patterns are important predictor of disease and good health and several studies have seen association between dietary patter and disease risks, such as obesity (Maskarinec, Novotny and Tasaki 2000; Schroder, Marrugat, Vila, Covas and Elosua 2004), CVD (Fung *et al.* 2001), metabolic syndrome, (Naja *et al.* 2013), and cancers (Heidemann *et al.* 2008). Numerous studies have examined the relationship of dietary pattern and excess weight/obesity among adults. Schroder *et al.* (2004) examined the association of BMI and obesity with the adherence to the traditional Mediterranean diet in a Spanish population. The Mediterranean diet is characterized by high intake of cereals, fruits, vegetables, legumes, nut, fish, high-fat dairy products, meat, red wine and olive oil as main source of fat. The study found that with increased adherence to the Mediterranean dietary pattern the obesity risk decreased in men and women even after controlling for potential confounders, and therefore concluded that the traditional Mediterranean dietary pattern is inversely associated with BMI and obesity (Schroder *et al.* 2004). In a cross-sectional study, Maskarinec *et al.* (2000) investigated the relationship between dietary patterns and body mass index among multiethnic women. Four significant dietary patterns were found. The “meat” dietary pattern that was characterized by high intake of processed and red meat, fish, poultry, eggs, fats and oils

and condiments. The “vegetable” dietary pattern, loaded high on different vegetables. The third dietary pattern “bean” was high in legumes, tofu, and soy protein. And last the “cold food” dietary patterns were high in fruit, fruit juice and cold breakfast cereals. After adjustment for daily energy intake, the “meat” dietary pattern was found to be positively associated with BMI, were as the other three dietary patterns had a negative association with BMI (Maskarinec *et al.* 2000). Naja *et al.* (2011) identified four dietary patterns in a cross-sectional population based survey in Lebanon. The “Western” pattern which was positively associated with fast food such as pies and pizzas, fast food sandwiches, fried potatoes, regular soda, bottled juices, meat poultry, cured meats, nuts and seeds, refined grains, mayonnaise, ice cream, and sweets. The “Traditional Lebanese” pattern, which was positively associated with traditional Lebanese food such as fruits, vegetables, fats and oils, and egg. The “Prudent” pattern, which was positively associated with food recognized as healthy, including primary whole bread, low-fat dairy and light soda and negative association with refined grains, fats, oils and regular soda, and last the “Fish and alcohol” pattern, which was associated with consumption of fish and alcohol. Among the four dietary patterns identified only the Western pattern was positively associated with BMI and WC (Naja *et al.* 2011). The result of these studies suggest dietary pattern characterized by high intake of whole grains, legumes, beans, vegetables, fruits and fish, olive oils, and moderate in red meat are negatively associated with obesity, were as those characterized by “ Western patter” rich in high-fat food increases risk of obesity (Naja *et al.* 2011).

d. Dietary Pattern among Children and Socio-Demographics and Lifestyle Correlation

Most studies on dietary patterns have been done on adults. However similar results have been found in children. Despite inconsistency between the results derived

from different studies, there are some similarities regarding dietary pattern identified among children around the preschool age. Several studies in this age group has identified repeatedly three or two main dietary pattern,” The Healthy“, The Traditional/transitive”, and “The junk/convenience-food/western” dietary pattern or just “healthy” and “unhealthy” dietary pattern (Bahreynian, Paknahad and Maracy 2013; Northstone and Emmett 2005; Okubo *et al.* 2012; Ovaskainen *et al.* 2009; Shang *et al.* 2012). “The healthy” dietary pattern in general is high in vegetables, fruits, fruit juices, legumes, fish, grains, dairy (sometimes full fat sometimes low-fat), whole grain bread, nuts and fat spread/ oils and meat and poultry in moderation. The traditional is related to the countries traditional food. For instance, Britain the traditional diet represent “meat and 2 vegetable diet” that is positively associated with meat and poultry, potatoes, root vegetables, green vegetables and legumes such as peas and sweet corn (North and Emmett 2000; Northstone and Emmett 2005; Ovaskainen *et al.* 2009). Where as in Finland it represents high intake of dairy spread and high-fat milk (Ovaskainen *et al.* 2009). The junk/convenience-food/western dietary pattern is high in processed food such as meat, pizza, sausages, bacon burgers, snacks, fried potato, soft drinks, refined grains, sweets desserts, (Bahreynian *et al.* 2013; Northstone and Emmett 2005).” The Western/junk-food” dietary pattern has been positively associated with odds of obesity in children around the preschool age in several studies. In addition it was found that Chinese children following a western dietary pattern had higher odds of abdominal obesity (Manios *et al.* 2010; Shang *et al.* 2012). Increasing number of studies has shown that children with mothers with: younger maternal age, shorter duration of education, lower house hold income, financial difficulties, higher number of children, daily smoking, lower employment status and higher BMI are a risk factor for feeding a more unhealthy dietary pattern. Whereas those with mothers of higher socio-economic status,

and had longer duration of breast-feeding, consume healthy diets compared with the latter (Okubo *et al.* 2012; Ovaskainen *et al.* 2009). There has also been noted that girls tend to consume more of the healthy dietary pattern even as early as preschool age (1½ - 4½ year of age) (North and Emmett 2000; Pryer and Rogers 2009).

In the Middle East there is limited research on dietary pattern and their determinants and association with obesity and even less data can be found for preschool children. The aim of this study is to: (i) identify and characterize the dietary pattern among Lebanese children aged 2-5 years old using factor analysis; (ii) evaluate association between dietary pattern, socio-demographic and lifestyle, energy and nutrients; and (iii) evaluate the association between dietary patterns and BMI.

CHAPTER II

MATERIALS AND METHODS

A. Study Design

This study is based on data collected from a national cross-sectional study entitled “Early Life and Health in Lebanon” (ELNAHL) that was conducted on a representative sample of 0-5 years old children and their mothers. More specifically this study focuses on the 2-5 year old population (n=531) and their mother to characterize the dietary pattern and its determinants and the association with BMI among those children.

In the ELNAHL project, a nationally representative sample of under-five children of both sexes was drawn from randomly selected households based on a stratified cluster sampling. The strata were the Lebanese governorates where the clusters were selected further at the level of districts and urban/rural areas. Housing units constituted the primary sampling units in the different districts of Lebanon. The sample size was assigned to detect an effect size of odds ratio of 2.5 at 80% power and 95% confidence interval

The geographical sample distribution is shown in Table 1.

Table 1. Geographical distribution of the study sample in ELNAHL project, assuming a sample size of 1030 subjects

Geographical Area	Population Distribution (%)*	Number of subjects for the national survey
Beirut	7.7	79
Beirut Suburbs	20.6	212
Mount Lebanon (Excl. Beirut Suburbs)	8.2	85
Akar, El-Menieh, El-Dinyeh	19.9	205
North Lebanon (Excl. Akar, El-menieh, El-Dinyeh)	10.2	105
Baalbak and El-Hermel	6.5	67
Beqaa (Excl. Baalbak and El-Hermel)	5.8	60
South Lebanon	14	144
Nabatyeh	7.1	73
Total	100	1031

* CAS and UNICEF: State of the Women and Children in Lebanon, 2009

Participants were recruited from the household unit from the six governorates of Lebanon according to the following criteria.

Mothers:

- *Inclusion Criteria:* Lebanese mothers within the age range of 19 and 40 years old, absence of hypertension and diabetes, not taking medications that may interfere with eating and breastfeeding patterns or affect body weight, and having a healthy child between 0-5 years old, of gestational age at birth ≥ 37 weeks.

- *Exclusion Criteria:* history of chronic illness and use of medications that may interfere with eating and breastfeeding patterns or body composition.

Children:

- *Inclusion Criteria:* generally absence of chronic illness, inborn errors of metabolism, physical malformations that may interfere with feeding patterns and body composition within the age range of birth up to 5 years old, born at term (of gestational age at birth ≥ 37 weeks).

- *Exclusion Criteria:* history of chronic illness, presence of inborn errors of metabolism or physical malformations, or use of medications that may interfere with feeding patterns and body composition.

B. Ethics

This study was based on data that was collected as part of the project entitled “early Life Nutrition and health in Lebanon” (ELNAHL), which was granted approval by the Institutional Review Board of the American University of Beirut. The questionnaire, the written consent form and the oral recruitment script were approved by the IRB. Every household that was chosen was informed about the study as written in the oral script. The mother was asked to read the consent form and sign it prior to starting the interview. For those who were illiterate, they were informed about the study orally by the interviewer in the presence of a witness and both the witness and the mother were asked to sign on the consent form. Every household received a gift for the baby and a nutrition education manual.

C. Survey Instrument

The questionnaire development was based on a thorough review of the literature and includes indicators proposed by the World Health Organization (WHO), Cooke *et al.* (2004), Wardle *et al.* (2001), Lakkoula *et al.* (2008), Skinner *et al.* (2002), Rockett and Wolf (1995) and Wilson, Magarey and Mastersson (2008). The different components of the questionnaire include:

- Socio-demographic and economic characteristics
- Dietary assessment of mothers and their child (24 hour recall)
- Dietary practices (eating environment, snacks and beverage consumption,

meal preparation, meal patterns)

- Feeding practices early in life (exclusive breastfeeding, duration of breastfeeding, continued breastfeeding at 1 year, introduction of solid, semi-solid or soft foods).

- Maternal eating patterns

- Anthropometric characteristics of mother and child (head circumference, mid-upper arm circumference, weight, length/height). Prior to its use in data collection, the questionnaire (Appendix I) was pilot- tested on a sample of 15 and modified accordingly.

D. Anthropometric Measurements

Anthropometric measurements were obtained from subjects and interpreted as follows.

1. Mothers

Height: Height was measured to the nearest 0.5 cm with the person bare footed, using a wall-mounted stadiometer. Measurements were taken twice and repeated a third time if the first two measurements differed by more than 0.5 cm.

Weight: Weight was measured, after voiding, to the nearest 0.1 kg with the person in light clothes and bare footed, using a standard clinical balance (Seca balance) (Seca model 11770 Germany). Measurements were taken twice and repeated a third time if the first two measurements differed by more 0.3 kg.

BMI was calculated as weight (kg)/height (m²) and interpreted according to the †WHO criteria as follows:

- Moderate and severe underweight: BMI < 17.0 kg/m²

- Underweight: BMI < 18.5 kg/m²
- Normal weight: BMI= 18.5–24.9 kg/m²
- Overweight: BMI= 25.0- 29.9 kg/m²
- Obesity: BMI ≥ 30.0 kg/m²

2. Children

Mid-upper arm circumference (MUAC): was measured using a calibrated plastic strip at the mid-point between the elbow and the shoulder (acromion and olecranon) of the left arm with the arm being relaxed and hanging down the side of the body). The MUAC was recorded to the nearest 0.1 cm. Measurements were taken twice and the average of the 2 values was used. Based on MUAC, values < 110 mm are indicative of severe under-nutrition, values between 110 and 120 mm indicate moderate malnutrition, values between 120 and 125 mm indicate a serious risk of under-nutrition, values between 125 and 135 mm indicate a moderate risk of under-nutrition while values ≥135 mm indicate a satisfactory nutritional status (FAO, Food Security Information For Action, <http://www.foodsec.org>).

Head Circumference (infants and young children 2-3 years old): was measured using a flexible, non-stretchable measuring tape. The infant/young child was placed in a sitting position in the lap of the caregiver. The lower edge of the measuring tape was placed just above the child's eyebrows, above the ears and around the occipital prominence at the back of the head, to allow the measurement of the maximal head circumference. Measurements were taken twice or until two measurements agree to 0.1 cm (1/8 in). For head circumference, values that are <3rd percentile for age or > 97th percentile for age are both indicative of health or developmental risk (WHO 2007).

Height: Height was measured to the nearest 0.5 cm with the child bare footed,

using a wall-mounted stadiometer. Measurements were taken twice and repeated a third time if the first two measurements differ by more than 0.5 cm.

Weight: was measured, after voiding, to the nearest 0.1 kg with the person in light clothes and bare footed, using a standard clinical balance (Seca balance) (Seca model 11770 Germany). Measurements were taken twice and repeated a third time if the first two measurements differ by more 0.3 kg.

Measurements were interpreted based on the WHO Global Database on Child Growth and Malnutrition (WHO 2007):

- At risk of overweight (classified as weight-for- height) defined as: Z-score cut-off point of $> +1$ SD
- Overweight (classified as weight-for- height): is defined as: Z-score cut-off point of $> +2$ SD
- Obese (classified as weight-for- height): is defined as: Z-score cut-off point of $> +3$ SD
- Underweight (classified as weight-for-age): is defined as: Z-score cut-off point < -2
- Wasted (classified as weight-for-height): is defined as: Z-score cut-off point < -2
- Stunted (classified as height-for-age): is defined as: Z-score cut-off point < -2
- Severely Stunted (classified as height-for-age): is defined as: Z-score cut-off point < -3

E. Dietary Intake Assessment (24 Hour Recall Data)

Dietary intake data pertinent to participating children and their mothers were collected using the 24hr multiple pass approach. The interviewers followed the 5 steps

of the USDA multiple pass 24hr recall approach, which included the quick list, the forgotten food list, the occasion and time at which foods were consumed, the detail cycle and the final probe review (Moshfegh *et al.* 1999). In order to help subjects in assessing the portion of the food consumed, quantification tools such as graduated food models and household measures were used. 24hr recall data were entered on Nutritionist Pro Diet Analysis software (www.nutritionistpro.com, Axxya Systems, 2009, Stafford, TX) and yielded two main outputs; the macronutrients and micronutrients intake of each child, and the child dietary intake, which was divided in to food groups in order to perform factor analysis. Total amount of servings of each food group was calculated.

F. Statistical Analysis

The current study is based on a secondary data analysis of the preschool children population (2-5 years old) of the national ELNAHL project. Data, which will be drawn from the administered questionnaires, include:

- Demographic and socio-economic characteristics of the household
- Anthropometric measurements for both the mothers and the children (2-5 years old)
- Maternal lifestyle and dietary characteristics
- Early life feeding patterns and practices (breastfeeding duration and exclusivity; complementary feeding introduction
- Lifestyle patterns, dietary intake and eating behaviors of the preschool children (2-5 years old)

G. Dietary Patterns Derivation

Foods were grouped into 17 food groups according to the similarity of their nutrient profiles and culinary usage (Hu *et al.* 1999). The total consumption for each group was determined by summing the daily intake of servings from each item in the food group. Food groups consumed by <5% of the participants were excluded (yoghurt based dishes, organ meat, burgol)

Some foods were classified separately due to their unique composition and distinct use, for example; Tea nuts and yogurt. Table 2 lists the 17 food groups that were used in analyses to describe eating patterns. Bread, rice and pasta group described the category of breads, cereals, baby cereals, rice, rice based dishes and pasta. Corn flakes and milk were grouped together. Dairy products included all types of cheeses and “Labneh” which are highly consumed among Lebanese. The fruits and vegetables group represented all raw fruits, fresh fruit juices, dried fruits and vegetables as well as cooked vegetables and vegetable based traditional dishes. Packed Fruit juice was separated from fresh fruit juice due to its high sugar content. Starchy vegetables and legumes is a category that contains as it names implies all dishes with starchy vegetables and legumes including the traditional dishes with added fat such as “Balila, foul be zeit and fassoulia bi zet”. Animal protein is a category that contains all meats including beef, poultry, and fish (including seafood) and also contains eggs since they are high source of animal protein. Pizzas pies and describe a certain diet trend that is remarkably high in breads and pastries. Fast food category represent typical fast food items such as French fries, hamburger, fried poultry such as nuggets and also includes Lebanese fast food such as falafel and tawouk sandwich. The composite food group consists of the Traditional Lebanese dishes including meat and poultry based dishes, legumes based dishes and vegetables stuffed dishes “Mahashi”.

Table 2. Food groups used in the factors analysis

Food group	Food items
Bread, rice and pasta	Breads, grains, cereals, toast, kaak, croissant, kaak bi halib, bledine cereal, cerelac wheat, corn flour/corn starch Rice_Rice_based_dishes: Rice and rice based dishes with chicken, beef, or fish (riz 3a djej, riz ma3 lahme, sayadiye), bledine rice, makloubet batenjen Pasta: spaghetti, lasagna, plain pasta, noodles
Cornflakes and milk	Plain corn flakes, Sweetened corn flakes, Formula milk, cow's milk, other animal's milk
Dairy products	Cheese, labne
Yoghurt	Plain yogurt
Fruit and Vegetables	Vegetables: all vegetables and salads, traditional dishes (only vegetables ex: loubie bi zeit, bamie bi zeit, hendbe), soup vegetables, yakhnet bazella Fruits: All fruits and fresh fruit juice, dried fruits, and tamer Veg based trad dish: loubie bi lahme, mloukhiye bi djej, batenjen mtabbal (baba ghannouj), vegetable soup
Starchy vegetables and Legumes	Starchy_vegetables: Corn, parsnips, green peas, potato (baked, boiled, mashed with milk and fat), pumpkin, squash (not zucchini) Legumes: lentils, chick peas, beans, traditional dishes (only legumes, ex: balila, foul, fassoulia bi zeit), foul mdamas
Nuts and seed	All sorts of nuts and seeds
Tea	Tea
Animal Protein	Beef: Steak, mashewi, kafta, Poultry: Chicken breast, chicken thigh, chicken wings, taouk, fried chicken (not:chicken, breaded chicken/escalope (fast food)) Fish: Fish fillet, seafood Egg: Boiled eggs, fried eggs
Pizza and pie	Mankouche, pizza, mouajanat
Fast Food	French fries, sandwich shawarma, hamburger, falafel, nuggets, broasted chicken, escalope, sandwich taouk
Composite (traditional dishes)	Meat poultry based trad dish: kafta w batata, djej w batata, kebbe, chicken soup Legume based trad dish: mjadara, fassoulia bi lahme, hommos bi tahini, soup addas, falafel Mahachi: koussa mehchi, batenjen mehshi, malfouf mehshi, selek mehshi, warak 3enab (all maheshi, either with meat or without meat)
Sweetened Dairy and Desserts	Sweetened dairy products: Hot chocolate, milkshakes, yogurt with fruits, ice cream (dairy based) and all ice cream, puddings (custard, mhalabiye, riz bi halib), sahlab, frozen yogurt Sweets and desserts: Chocolates, cookies, sweets, cakes, plain sugar, pastries, meghli, traditional desserts and sweets, jam, chocolate spread, biscuits (plain and sweetened), gello, popscile
Sweetened beverages	Regular soda, sharab tout, sharab may wared, packed juice,
Added fats and oil	All added fats and oils, zaatar w zeit, olives, lard, peanut butter, tarator, butter, mayonnaise
Salty snacks	Chips, salty cracottes, pretzels, popcorn
Condiments	makdous, soup maggie, ground thyme, pickles, condiments, ketchup, mustard

Desserts and sweetened dairy group consist of food items high in added sugar such as puddings hot chocolate, ice cream and all sorts of deserts. Sweetened beverages represent all kind of sodas and drinks with added sugar. Added fat and oil category includes all added fats such as peanut butter, olive oil and thyme, sesame paste (taratour), butter, mayonnaise and lard. Salty snack represents all type of salty snacks including popcorn chips, pretzels. Last group included in the factor analysis is the condiments, which contains items such as ketchup, pickles and “maggi soups”.

Factor analysis was used to identify dietary pattern. The X^2 for the Bartlett test of sphericity was significant at $P < 0.05$, and the Kaiser–Meyer–Olkin test showed a score of > 0.5 , indicating that the correlation among the variables was sufficiently strong for a factor analysis. The number of factors retained was based on three criteria: (i) the Kaiser criterion (eigenvalues > 1); (ii) inflection point of the scree plot; and (iii) interpretability of factors. The factors were rotated using a Varimax rotation (orthogonal transformation). Factor loadings indicated the strength and direction of the association between the patterns and food groups. The derived dietary patterns were labeled on the basis of food groups having a rotated factor loading > 0.2 . Factor scores were calculated using the multiple regression approach and each individual received a factor score for each dietary pattern. These scores indicated the degree to which each participant’s diet corresponded to the identified pattern. A high positive loading was indicative of a strong association between the food item and the pattern, while a negative loading indicated an inverse association with the pattern.

H. Statistical Analysis

Frequencies, means and standard deviation (SD) were used to describe socio-demographics, lifestyle, and anthropometric characteristics of the children and mothers.

Independent student t-test and Chi-square test were used to compare continuous and categorical variables. Categorical variables were expressed as percentages and continuous variables were expressed as means. Pearson's correlation coefficient was used to examine the association between the dietary patterns and energy and energy-adjusted nutrient intake. Energy adjustment was carried out using the regression residual method (Willett, Howe and Kushi 1997). Multiple linear regression analysis was used to assess the correlates/determinants/association of the dietary pattern, with factor scores for each of the identified patterns as dependent variables and the socio-demographics and lifestyle characteristics as independent variable.

The association between dietary patterns and BMI were assessed using multivariate logistic regression. For each pattern, participants were grouped into tertiles of pattern scores in order to derive odds of obesity with adherence to the dietary patterns. Two models were done, one that controlled for age and sex of the child and the second controlled for age, sex and socio-demographic and lifestyle factors. All analyses were two tailed, and a p -value < 0.05 was considered statistically significant. The Statistical Package for the Social Sciences was used for all derivations.

I. List of Variables Used in the Analysis

Variables of interest for the present analysis were derived from the children and the adult questionnaire of the same household. Description of the variables used in this study is shown in Table 3.

Table 3. List of variables used in the analysis

Variable	Type	Description/Coding
Socio-demographic variables		
Mother's age (years)	Continuous	
Child's age (years)	Continuous	
Sex of child	Categorical	Male Female
Marital status of mother	Categorical	1=married 2=unmarried
Whether mother is specialized in health related major	Categorical	0=No 1=Yes
Whether mother is self-interested in a health related major		0=No 1=Yes
Educational level of mother	Categorical	1=primary 2=intermediate, high tech 3=university
Employment status of mother	Categorical	1=employed 2=unemployed
Educational level of husband	Categorical	1=primary or less 2=intermediate, high-school, tech 3=university
Employment status of the husband	Categorical	1=gov and private 2=self owned 3=employed
Crowding Index	Categorical	1=>1 2=<1
Monthly Income	Categorical	1=<600,000L.L 2=600,001-1,000,000 L.L 3=1,000,001-1,500,000L.L 4=1,500,001-2,500,000L.L 5=2,500,001-3,000,000L.L 6=>3,000,000L.L 7= Does not know
Type of school	Categorical	Private Public Both
Number of children in the family	Categorical	1-2 3-5 >5
Birth order	Categorical	1 2 3 >=4
Presence of paid helper		Yes No

“Table 3 – *Continued*”

Variable	Type	Description/Coding
Anthropometric variables		
Anthropometric measurements: Weight (Kg), Height (cm) (child)	Continuous	Measured following recommended standards
BMI for age z-scores (child)	Categorical	Wasted Normal Risk of overweight Overweight Obese
Overweight/obese (child)		0=normal 1=overweight obese
BMI mother		Normal Overweight Obese
Lifestyle Dietary intake variables		
Servings of food groups		
Bread cereals Corn flakes Rice based dishes Milk Yogurt Dairy products Sweetened dairy products Fruits Juice fresh Vegetables Starchy Vegetables Legumes Nuts and seeds Beef Poultry Fish Eggs Fast food Pizza pie Meat poultry based trad dish Vegetable based trad dish Legumes based trad dish Mahashi Pasta based dish Condiments Added fats oil Salty snacks Sweets desserts Sweetened beverages Tea	Continuous	(Derived from Nutri Pro software then converted to servings using ADA 2008 for food groups and Nutripro for mixed dishes)
FAC1_59	Continuous	Factor score for sweet pattern

“Table 3 – *Continued*”

Variable	Type	Description/Coding
FAC2_59		Factor score for Lebanese pattern
Sum of Kilocalories	Continuous	Sum of calories consumed by each child
Carbohydrate (g) Protein (g) Fat Total (g) Cholesterol (mg) Saturated Fat (g) Mono-unsaturated Fat (g) Polyunsaturated Fat (g) Trans Fatty Acid (g) Sodium (mg) Calcium (mg) Iron (mg) Dietary Fiber Total (g) Sugar Total (g)	Continuous	(Derived from Nutri Pro software)
Exclusively breastfed at 6 month	Categorical	<6 month ≥ 6 month
Responsibility of feeding: Myself (mother)	Categorical	No Yes
Responsibility of feeding: Husband	Categorical	No Yes
Responsibility of feeding: My parents	Categorical	No Yes
Responsibility of feeding: Husband parents	Categorical	No Yes
Responsibility of feeding: Helper	Categorical	No Yes
Responsibility of feeding: Other	Categorical	No Yes
Who is the main person that prepares main meal in the house?	Categorical	Other Myself
Take away meals/week	Categorical	<1 1-3 ≥3
Eat at restaurants/week	Categorical	<1 1-3 ≥3
Do you allow your child to self-feed	Categorical	No Yes
Age of introduction of solid food	Categorical	< 6 month ≥ 6 month
Eat dinner in front of the T.V sum/week	Continuous	
Eat the main meal with family when at home sum/week	Continuous	

“Table 3 – *Continued*”

Variable	Type	Description/Coding
Snack in front of the T.V sum/week	Continuous	
Eat breakfast sum/week	Continuous	
Eat fast food sum/week	Continuous	

CHAPTER III

RESULTS

A. Descriptive Data

1. Socio-Demographics and Lifestyle

The study population consists of 531 Lebanese mothers and their 2-5 year old children. Table 4 shows the socio-demographic, lifestyle, parental and household characteristics of the study subjects according to sex of the child. Mean age of participating mothers and children was 32.73 ± 5.92 and 3.30 ± 0.881 with no difference between boys and girls. The majority of the mothers (61.6%) attained intermediate or high school level of education. Only 3.7% of the mothers specialized in a health-related major, but most participating mothers (80.5%) reported interest in health field. Most of the mothers (84.9%) were unemployed. As for the fathers' educational level, 62.8% achieved intermediate or high school level. Almost all of the fathers (93.2%) were employed however; there was a significant difference in employment status of the father between the two sexes. As for the monthly income of the household, 48.1% reported earning between 600,000-1,500,000L.L. Majority of the families (83.7%) did not have a paid helper in the house. Using the crowding index measure, 88.5% of the households had crowding index ≥ 1 person per room. Over 69.7% of the children attend private school. There was a significant difference in family size between girls and boys. Average weight and height of the children were 15.50 ± 3.02 and 96.43 ± 8.62 respectively, with boys being significantly taller and heavier than the girls. Most of the children (64.4%) had normal BMI, 26.3% was at risk of overweight. 6.5% were overweight and 2.7% were obese. As for the mothers BMI, 41.4%, 34.5% and 24.1%

were normal, overweight and obese respectively. The proportion of boys that ate dinner in front of the T.V was significantly higher than among girls. All other socio-demographic and life style factors were the same.

Table 4. Socio-demographic and lifestyle characteristics of the study population

	Total (n=531)	Boys (n=284)	Girls (n=247)	Significance
Mean SD				
Mother's age (years)	32.73±5.92	32.49±6.05	33.02±5.78	P=0.317
Child's age (years)	3.30±0.881	3.30±0.89	3.29±0.82	P=0.881
N (%)				
Marital status of the mother				X ² =1.323, P>0.05
Married	520(97.9)	280(98.6)	240(97.2)	
Unmarried	11(2.1)	4(1.4)	7(2.8)	
Educational level of mother				X ² =0.855, P>0.05
Primary	101(19.0)	52(18.3)	49(19.8)	
Intermediate, high school Technical diploma	327(61.6)	180(63.4)	147(59.5)	
University	103(19.4)	52(18.3)	51(20.6)	
Mother specialized in health related major				X ² =0.271, P>0.05
No	494(96.3)	264(96.7)	230(95.8)	
Yes	19(3.7)	9(3.3)	10(4.2)	
Mother is self-interested in health related majors				X ² =0.259, P>0.05
No	103(19.3)	53(18.7)	50(20.5)	
Yes	424(80.5)	230(81.3)	194(79.5)	
Employment status of mother				X ² =3.078, P>0.05
Employed	80(15.1)	50(17.6)	30(12.1)	
Unemployed	451(84.9)	234(82.4)	217(87.9)	
Educational level of husband				X ² =0.254, P>0.05
Primary or less	116(22.2)	60(21.4)	56(23.1)	
Intermediate, High school, Technical diploma	328(62.8)	177(63.2)	151(62.4)	
University	78(14.9)	43(15.4)	35(14.5)	
Employment status of husband				X ² =4.685, P=0.03
Employed	495(93.2)	271(95.4)	224(90.7)	
Unemployed	36(6.8)	13(4.6)	23(9.3)	
Monthly income of family				X ² =8.358, P>0.05
<600,000L.L	47(9.6)	27(10.1)	20(9.0)	
600,001-1,000,000 L.L	126(25.7)	56(20.9)	70(31.4)	
1,000,001-1,500,000L.L	110(22.4)	63(23.5)	47(21.1)	
1,500,001-2,500,000L.L	96(19.6)	59(22.0)	37(16.6)	
2,500,001-3,000,000L.L	23(4.7)	14(5.2)	9(4.0)	
>3,000,000L.L	41(8.4)	21(7.8)	20(9.0)	
Does not know	48(9.8)	28(10.4)	20(9.0)	

“Table 4 – Continued”

	Total (n=531)	Boys (n=284)	Girls (n=247)	Significance
CI				$X^2=0.439, P>0.05$
>=1	469(88.5)	248(87.6)	221(89.5)	
<1	61(11.5)	35(12.4)	26(10.5)	
Type of school				$X^2=3.411, P>0.05$
Private	313(69.7)	171(72.8)	142(66.4)	
Public	107(23.8)	53(22.6)	54(25.2)	
Both	29(6.5)	11(4.7)	18(8.4)	
Number of children in the family				$X^2=7.388, P=0.025$
1-2	274(51.6)	152(53.8)	122(49.4)	
3-5	234(44.1)	126(44.4)	108(43.7)	
>5	23(4.3)	6(2.1)	17(6.9)	
Infant birth order				$X^2=3.361, P>0.05$
1	113(21.3)	67(23.6)	46(18.6)	
2	118(33.9)	95(33.5)	85(34.4)	
3	126(23.7)	69(24.3)	57(23.1)	
>=4	112(21.1)	53(18.7)	59(23.7)	
Presence of paid helper				$X^2=0.480, P>0.05$
No	442(83.7)	239(84.8)	203(82.5)	
Yes	86(16.3)	43(15.2)	43(17.5)	
Anthropometric characteristics of mother and child				
Child				
Mean SD				
Weight (Kg)	15.50±3.02	15.7±2.74	15.22±3.29	P=0.049
Height (cm)	96.43±8.62	96.91±9.24	95.86±7.82	P=0.043
BMI for age child (WHO 2007)				$X^2=1.910, P>0.05$
Wasted	1(0.2)	0(0.0)	1(0.4)	
Normal	338(64.4)	177(63.0)	161(66.0)	
Risk of overweight	138(26.3)	78(27.8)	60(24.6)	
Overweight	34(6.5)	18(6.4)	16(6.6)	
Obese	14(2.7)	8(2.8)	6(2.5)	
BMI mother				$X^2=3.519, P>0.05$
Normal	206(41.4)	119(45.1)	87(37.2)	
Overweight	172(34.5)	83(31.4)	89(38.0)	
Obese	120(24.1)	62(23.5)	58(24.8)	
Lifestyle and Dietary Habits				
Exclusively breastfed at 6 month				$X^2=0.901, P>0.05$
<6 month	398(82.9)	217(84.4)	181(81.2)	
>=6 month	82(17.1)	40(15.6)	42(18.8)	
Responsibility of feeding: Myself (Mothers)				$X^2=0.602, P>0.05$
No	18(3.4)	8(2.8)	10(4.1)	
Yes	510(96.6)	274(97.2)	236(95.9)	
Responsibility of feeding: Husband				$X^2=0.788, P>0.05$
No	481(91.1)	254(90.1)	227(92.3)	
Yes	47(8.9)	28(9.9)	19(7.7)	
Responsibility of feeding: My parents				$X^2=0.900, P>0.05$
No	491(94.1)	268(95.0)	229(93.1)	

“Table 4 – Continued”

	Total (n=531)	Boys (n=284)	Girls (n=247)	Significance
Yes	31(5.9)	14(5.0)	17(6.9)	
Responsibility of feeding: Husband parents				X ² =0.21, P>0.05
No	503(95.3)	269(95.4)	234(95.1)	
Yes	25(4.7)	13(4.6)	12(4.9)	
Responsibility of feeding: helper				X ² =0.444, P>0.05
No	510(96.6)	271(96.1)	239(97.2)	
Yes	18(3.5)	11(3.9)	7(2.8)	
Responsibility of feeding: Other				X ² =7.026, p=0.008
No	482(91.3)	266(94.3)	216(87.8)	
Yes	46(8.7)	16(5.7)	30(12.2)	
Who is the main person that prepares main meals in the house				X ² =1.298, P>0.05
Other	30(5.7)	13(4.6)	17(6.9)	
Myself	498(94.3)	269(95.4)	229(93.1)	
Take away meals/week				X ² =0.574, P>0.05
<1	390(73.9)	205(72.7)	185(75.2)	
1-3	128(24.2)	72(25.5)	56(22.8)	
>=3	10(1.9)	5(1.8)	5(2.0)	
Eat at restaurants/week				X ² =2.540, P>0.05
<1	171(32.3)	83(29.3)	88(35.8)	
1-3	276(52.2)	155(54.8)	121(49.2)	
>=3	82(15.5)	45(15.9)	37(15.0)	
Do you allow your child to self-feed				X ² =3.22, P>0.05
No	52(9.8)	34(12.0)	18(7.3)	
Yes	476(90.2)	249(88.0)	227(92.7)	
Age of intro of solid foods				X ² =0.181, P>0.05
< 6 month	218(41.1)	119(41.9)	99(40.1)	
>= 6 month	313(58.9)	165(58.1)	148(59.9)	
Mean SD				
Eat dinner in front of the T.V/week	3.57±3.63	3.87±3.89	3.24±3.29	P=0.046
Eat the main meal with the family when at home/week	9.88±6.45	10.00±6.8	9.73±6.03	P=0.633
Snack in front of the T.V/week	4.8±5.98	4.82±6.07	4.78±5.88	P=0.937
Breakfast/week	6.74±1.66	6.75±1.65	6.73±1.68	P=0.887
Eat fast food times/week	1.29±1.55	1.34±1.60	1.24±1.49	P=0.466

LL, Lebanese Liras; TV, television,

Categorical variables are expressed as n and % continuous variables are expressed as mean and SD

Significance is derived using an independent t test for continuous variables and X² test for categorical variables.

2. Dietary Pattern Extracted by Factor Loading

Factor analysis retained two factors that were labeled as the “sweet” pattern and the “Lebanese pattern”. The two patterns explained 19.13% of the total variance. The association between each food group and the dietary pattern and its factor loadings is indicated in Table 5.

Table 5. Rotated factor loading matrix for the derived dietary patterns

	DIETARY PATTERNS	
	Sweet	Lebanese
Sweetened beverages	0.647	-0.274
Fast Food	0.485	-0.144
Cornflakes and milk	-0.482	-0.224
Salty snacks	0.415	-0.193
Sweetened Dairy and Desserts	0.385	0.062
Condiments	0.302	-0.006
Added fats and oil	0.266	0.262
Animal Protein	0.238	0.109
Composite (traditional dishes)	-0.218	-0.064
Bread, rice, cereals	0.183	0.629
Dairy products	-0.080	0.504
Tea	0.324	0.407
Pizza and pie	0.207	-0.393
Fruit and Vegetables	0.013	0.337
Starchy vegetables and Legumes	0.000	0.301
Yoghurt	-0.016	0.301
Nuts and seed	0.057	0.232

Total variance explained by all of the patters is 19.13%
Loading ≥ 0.2 are given bold

The sweet pattern was associated positively with sweetened beverages (0.647), Fast food (0.485), Salty snack (0.415), Sweetened dairy and desserts (0.385), Condiments (0.302), Added fats and oil (0.266), Animal protein (0.238), Tea (0.324) and Pizza and pie (0.207). The Lebanese pattern had positive association with added fat and oil (0.262), bread, rice and pasta (0.629), dairy products (0.504), Tea (0.407), fruits and vegetables (0.337), starchy vegetables and legumes (0.301), yogurt (0.301) and nuts

and seeds (0.232). The negative loading represents items that were negatively associated with a dietary pattern such as and composite (-0.218) with the western pattern. Negative association was also seen among sweetened beverages (-0.274) and pizza and pie (-0.393) with the Lebanese Pattern. Corn flakes and milk were loading negative on both the west pattern (-0.485) and Lebanese pattern (-0.224).

3. Correlation between Dietary Patterns and Energy Intake and Energy Adjusted Nutrients

Table 6 shows the association between the factor score of the two dietary patterns with energy and energy adjusted nutrient intake as assessed by Pearson's correlation coefficients. Sweet pattern was positive association with sugar, PUFA and MUFA.

Table 6. Pearson's correlation Coefficients of the association between dietary pattern score with energy adjusted nutrients

	Dietary Patterns	
	Sweet	Lebanese
Energy	0.505**	0.205**
Carbohydrates	0.231**	0.145**
Protein	-0.278*	0.106*
Total FAT	-0.116**	-0.185**
Saturated fat	-0.315**	-0.191**
TRANS Fat	-0.012	-0.081
DHA	0.045	0.049
EPA	0.027	0.048
PUFA	0.101*	-0.144**
MUFA	0.090*	-0.095*
Cholesterol	-0.064	-0.086
SUGAR	0.105*	-0.184**
DIETARY FIBER	-0.151**	0.159**
IRON	0.037	0.051
Calcium	-0.492**	-0.049

*Correlation significant at $p < 0.05$

** Correlation significant at $p < 0.01$

Both dietary patterns had positive association with Energy and carbohydrates; however the association was stronger for the sweet pattern. As for the Lebanese pattern, the higher the score, the greater were the intake protein and fiber. The Sweet pattern had a negative association with Total Fat, saturated fat, protein, dietary fibers and calcium. Were as the Lebanese pattern was negatively associated with Total fat, saturated fat, PUFA, MUFA and Sugar

4. Determinants of Dietary Patterns (Multivariate Linear Regression)

Multivariate linear regression model were used to examine the determinants between selected socio-demographics and lifestyle characteristics with the score of the two patterns.

Table 7. Correlates of the identified dietary patterns in the study population as assessed by multivariate linear regression

Variable	Sweet		Lebanese	
	β	95%CI	β	95%CI
Mother age	-0.011	-0.033, 0.010	-0.002	-0.025, 0.020
Child age in year	0.221	0.082, 0.359	0.144	-0.003, 0.291
BMI mother	-0.019	-0.153, 0.115	0.095	-0.048, 0.238
Sex of child	-0.119	-0.331, 0.093	-0.221	-0.448, 0.005
Marital status	0.599	-0.839, 2.037	-0.730	-2.263, 0.802
Educational level of mother	-0.333	-0.568, -0.098	0.202	-0.048, 0.453
Whether mother is specialized in a health related major	-0.263	-0.895, 0.370	-0.059	-0.734, 0.615
Whether mother is self-interested in a health related major	-0.304	-0.586, -0.022	0.000	-0.301, 0.300
Employment status of the mother	0.087	-0.227, 0.401	0.197	-0.137, 0.532
Educational level of husband	-0.079	-0.304, 0.145	0.042	-0.197, 0.282
Employment status of the father	-0.300	-0.810, 0.209	0.476	-0.066, 1.019
Monthly income of household	0.026	-0.035, 0.087	-0.069	-0.134, -0.004
Crowding Index	-0.058	-0.453, 0.337	0.285	-0.136, 0.707
Type of school	-0.056	-0.255, 0.142	-0.020	-0.231, 0.192
Eat breakfast times/week	0.086	0.019, 0.153	0.041	-0.030, 0.113
Eat dinner in front of the T.V times/week	0.025	-0.008, 0.058	-0.034	-0.069, 0.001

“Table 7 – Continued”

Variable	Sweet		Lebanese	
	Multivariate		Multivariate	
	β	95%CI	β	95%CI
Eat snack in front of the T.V times/week	0.012	-0.006, 0.031	0.012	-0.008, 0.032
Eat fast food times/week	0.069	-0.018, 0.156	-0.118	-0.211, -0.026
Eat in non-fast food restaurants times/week	0.007	-0.128, 0.142	-0.036	-0.180, 0.108
Eat the main meal with the family when at home times/week	-0.001	-0.018, 0.016	0.005	-0.013, 0.023
Do you have a paid helper in the house?	0.032	-0.305, 0.369	-0.491	-0.851, -0.132
Number of children in the family	0.199	-0.145, 0.543	0.181	-0.185, 0.548
Infant birth order	-0.009	-0.187, 0.170	0.075	-0.116, 0.265
Exclusively breastfed at 6 months (< 6 month or > 6 month)	0.038	-0.266, 0.342	0.005	-0.319, 0.330
Responsibility of the feeding: MYSELF	-0.488	-1.194, 0.218	-0.209	-0.961, 0.543
Responsibility of the feeding: HUSBAND	-0.337	-0.707, 0.033	-0.111	-0.505, 0.283
Responsibility of the feeding: MY PARENTS	-0.159	-0.670, 0.352	0.277	-0.268, 0.822
Responsibility of the feeding: HUSBAND'S PARENTS	0.664	0.093, 1.236	-0.294	-0.903, 0.315
Responsibility of the feeding: HELPER	-0.107	-0.731, 0.517	0.450	-0.215, 1.114
Responsibility of the feeding: OTHERS	-0.218	-0.603, 0.167	-0.076	-0.486, 0.334
Take a way meals/week	0.041	-0.147, 0.230	0.037	-0.164, 0.238
Eat at restaurants/week	-0.156	-0.412, 0.100	0.036	-0.236, 0.309
Main person prepares the meal at home (myself/others)	-0.108	-0.735, 0.519	-0.278	-0.946, 0.390
Age of intro of solid foods	-0.222	-0.455, 0.011	0.186	-0.062, 0.434
Do you allow your child to self-feed	-0.103	-0.471, 0.266	-0.061	-0.454, 0.332

Values in this table are linear regression coefficients and their corresponding 95% confident interval

The sweet dietary pattern was more adopted by older children and more common among children who consumed breakfast. Children who were fed by their grandparents (father side) were more likely to follow the sweet pattern. However, the higher the education of the mother the less likely the child is to follow the sweet dietary

pattern.

The Lebanese pattern was negatively associated with the household income. The more the child ate fast food per week the less likely was the child to follow a Lebanese dietary pattern. The presence of a paid helper in the household was negatively associated with the Lebanese pattern.

5. Adherence to Dietary Pattern and Odds Of Obesity

Table 8 shows the association between tertiles of the identified dietary pattern score with overweight and obesity among the children.

When adjusting for age and sex, no significant associations were found between dietary pattern and odds of obesity. However children belonging to the third tertile of the Lebanese pattern had 70% lower risk of being overweight and obese (OR: 0.3, 95% CI: 0.09-0.98) when adjusted for age-sex and other socio-demographics and lifestyle factors. However, no significant association was found between the sweet patten and risk of obesity across the tertiles.

Table 8. Odds of overweight and obesity across tertiles of dietary patterns scores

Variable	Sweet		Lebanese	
	Model 1 OR (95%CI)	Model 2 OR (95%CI)	Model 1 OR (95%CI)	Model 2 OR (95%CI)
First tertile	1	1	1	1
Second tertile	0.97(0.48,1.94)	2.15(0.724,6.38)	0.65(0.33,1.37)	0.98(0.31,3.04)
Third tertile	0.61(0.282-1.32)	0.74(0.20,2.78)	0.65(0.32,1.34)	0.30(0.09-0.98)

Values in this table are OR and 95% CI.

Model1, OR adjusted for child age and sex

Model 2: OR adjusted for child age and sex and socio-demographics and lifestyle factors done in the linear regression

CHAPTER IV

DISCUSSION

The present studies identified and characterized the dietary pattern among Lebanese children aged 2-5 years old and their association with energy, nutrients, socio-demographic and lifestyle variables and obesity. Using factor analysis two dietary patterns were identified: the “Sweet” pattern and the “Lebanese” pattern. The “sweet” pattern was characterized by high intake of sweetened beverages, fast food, salty snack, sweetened dairy and desserts, condiments, added fats, oil, animal protein, tea, pizza and pie. The “Lebanese” pattern was characterized by high intake of bread, rice and pasta, dairy products, tea, fruits and vegetables, starchy vegetables and legumes, yogurt, added fat, oil, nuts and seeds. Several socio-demographic and lifestyle factors were significantly associated with the patterns, such as age of the child, the mother’s educational level, the household income, the presence of a paid helper, the breakfast consumption and the feeding of the child by the grandparents. Risk of obesity decreased 70% for children in the third tertile of the Lebanese pattern when adjusted for age-sex and socio-demographic and lifestyle variables. No association was found between the “sweet” pattern and risk of obesity.

A. Dietary Patterns

The two dietary patterns derived in this study showed similarities to patterns identified in other studies, however, comparing dietary patterns across different cultures is difficult due to differences in dietary habits; therefore some differences were identified. Below I will discuss the similarities and the contradictory findings of this

study with other studies.

Most studies identifies repeatedly two or three main dietary patterns, the healthy -“The Traditional/transitive”, and “The junk/convenience-food/western-sweet” dietary pattern or just “healthy” and “unhealthy” dietary pattern (Bahreynian *et al.* 2013; Northstone and Emmett 2005; Okubo *et al.* 2012; Ovaskainen *et al.* 2009; Shang *et al.* 2012). “The healthy” dietary pattern in general is high in vegetables, fruits, legumes, fish, grains, dairy (sometimes full fat sometimes low-fat), whole grain bread, nuts and fat spread/ oils, with meat and poultry moderate consumption (North and Emmett 2000; Northstone and Emmett 2005; Ovaskainen *et al.* 2009).

The traditional dietary pattern is related to the countries traditional food, such as the “Lebanese” pattern identified in this study, which represent the healthy dietary pattern with fruits and vegetables being the essential elements of the Lebanese diet (Naja *et al.* 2011). The junk/convenience-food/western-sweet dietary pattern is generally defined as high fat and/or high sugar processed food with meat, pizza, sausages, bacon burgers, snacks, fried potato, soft drinks, refined grains and sweets desserts (Bahreynian *et al.* 2013; Northstone and Emmett 2005; Okubo *et al.* 2012; Ovaskainen *et al.* 2009). This pattern is very similar to the sweet patter in the present study.

Comparing studies in western and non-western countries and studies done in the eastern Mediterranean region with the dietary patterns derived in this study allows us to understand our findings better.

Ovaskainen *et al.* (2009) found three main dietary patterns in three and six year old preschool children in Finland, the “healthy”, “traditional” and “fast food - sweet” patterns. The healthy pattern was associated with skimmed milk, whole-grain bread and vegetables. The traditional pattern was related to high intake of dairy spread and high-

fat milk. The fast food-sweets had highest positive association with intake of sugar-sweetened beverages, fried potatoes, chips and nuts dried fruits (Ovaskainen *et al.* 2009). In the aforementioned study, similarities can be observed in the dietary patterns when comparing it to our findings. The “healthy” dietary pattern was loaded highly with vegetables like the Lebanese pattern described in this study, were as the “fast food, sweet” pattern loaded high in sugar and unhealthy foods such as sugar sweetened beverages, chips, and fried potato.

However, when comparing studies done in the Mediterranean region, more resemblance can be recognized. One study done in Iran, reported that three major dietary patterns were found in children aged 7-11 year old, the “healthy”, “western” and “sweet-dairy” pattern. The healthy dietary pattern was characterized mostly by fruits, vegetables, low-fat dairy products, legumes, nuts, poultry and fish. Whereas the “western” pattern was highly loaded with processed meat, snack, pizza, soft drinks and mayonnaise. The “sweet-dairy” pattern had high amount of dairy products, sugars, sweets and deserts (Bahreynian *et al.* 2013). Similarly, the GENESIS study conducted in Greece among children aged 1-5 year old identified two dietary patterns: the “healthy” and the “unhealthy” dietary patterns. The healthy pattern was associated with fruits, vegetables, legumes, grains fish and oils. However the unhealthy was loaded with high intake of red meat, sweets and low intake of vegetables (Manios *et al.* 2010). Studies on dietary pattern among preschoolers in the region are scares.

Study done in Lebanon but among adults identified a “western” and a “Lebanese” dietary pattern. Western pattern was characterized mainly by high consumption of fried potatoes, pizzas and pies, soda drinks, fast-food sandwiches and sweets. The Lebanese pattern reflected high intake of fruits, vegetables, legumes and olives. Both very similar to the patterns identifies in this study. In addition to the

mentioned patterns, two other patterns namely “prudent” and “fish and alcohol” patterns were found (Naja *et al.* 2011). These patterns are characteristic of adults, not expected to be observed in children especially not in preschooler.

Comparing dietary pattern between studies is difficult due to differences in dietary assessment methods, the number and type of food grouping, the number of pattern chosen to be retained and the different type of statistical technique used to analyze the data (Tucker 2010).

B. Correlation between Dietary Pattern and Energy Intake and Energy Adjusted Nutrients

In accordance with other studies the sweet pattern derived in this study was highly correlated with intake of energy, carbohydrates and sugar. It is no surprise that it is positively correlated with carbohydrates and sugar since the four food groups with the highest loading on the sweet pattern were the sweetened beverages, fast food, salty snacks and the sweetened dairy and dessert group, all being carbohydrate based food and all except salty snack were high in sugar. In a cross-sectional study conducted among 6-13 year old children in China, three dietary patterns were identified: The “healthy” the “transitive” and the “western”. Children following the western pattern had higher intake of carbohydrate and total energy than the healthy pattern, similarly to our study (Shang *et al.* 2012). Pryer and Rogers (2009) reported that boys aged 1½-4 years old following the so-called “traditional diet” which in this study was the least healthy of the three dietary patterns identified, had the highest intake of carbohydrates, sugar, total fat, SFA and MUFA as a percentage of energy. The “sweet” pattern identified in this paper was also positively correlated with PUFA and MUFA. However, the sweet pattern did not have a positive correlation with total fat, in contrary it was negatively

correlated with total fat and saturated fat. By comparing the mean intake of fat across the tertiles of sweet pattern it showed that the more the child adhered to the sweet pattern the more he or she ate from the sugar containing groups while the fat consumption remains relatively constant. In fact, the reason for choosing to name this pattern “the sweet pattern” and not “the western pattern” was due to this negative association with total fat and saturated fat and positive association with sugar. The western pattern is typically high in fat.

The sweet pattern derived in this study, like typical other unhealthy patterns, was negatively correlated with calcium and dietary fiber (Naja *et al.* 2011; Tucker 2010).

Correlation studies on energy intake and nutrients are limited among preschoolers. Most studies done on dietary pattern among preschoolers only report the socio-demographic associations of the children with the dietary pattern (Tucker 2010).

The Lebanese pattern identified in this paper correlated highest with dietary fiber and protein. This is mainly due to the fact that the pattern was highly loaded in fruits, vegetables and legumes. This is typically seen in the Lebanese pattern and other patterns characterized as “healthy” (Naja *et al.* 2011). In addition, the negative association of the Lebanese pattern in this study with total fat, saturated fat and sugar is comparable with different studies conducted by Naja *et al.* in Lebanon among adults. In 2013, Naja *et al.* reported a negative association of the “Lebanese” pattern with sugar and saturated fat, however both were not significant. In 2011, a strong negative correlation was found between the “Lebanese” pattern and total fat.

Important to add that most of the aforementioned studies comparing dietary pattern with energy adjusted nutrients used food frequency questionnaire to gather information on food intake were as in this study only one 24-hr dietary recall was used,

which might not have captured day to day variation and might have led to under or over estimation of macro and micronutrient intake.

C. Determinants of Dietary Pattern

In this study it was found that the identified patterns were associated with several socio-demographic and lifestyle factors

Older children were found to be more likely to follow the “sweet” pattern, in fact this was seen in both patterns. However in the Lebanese pattern it was not significant. This suggests that the older the child is the clearer is what pattern the child belongs to. A study comparing the consistency of the dietary pattern obtained in 4 year olds and 7 year olds suggest that the child dietary habits are established by the age of four and then remain relatively constant during childhood (Northstone and Emmett 2005). In this study the mean age of the children was 3.30 ± 0.881 years. Children younger than four years old might not yet have a constant pattern, and therefore exhibit a great variance, from day to day or period-to-period. This might not have been captured in this study since it used one 24 hour dietary recall to derive the dietary patterns. In addition, the older the child is the more the food choice is self-determined and influenced by television and media (Jones *et al.* 2014), which in turn may increase the impact of nutritional transition that is observed in the Middle East. A major dietary change that has been observed is the adaptation of western diet leading to increase in consumption of added sugar and fat (Jones *et al.* 2014; Popkin 2001). This suggests that the older the child is the more he or she is affected by the nutritional transition observed in Lebanon. No studies in this age group were found to describe the correlation between age and dietary patterns. However, in two studies done among adults in Lebanon by Naja *et al.* (2011, 2013) reported that younger aged adults were more likely to follow

the western pattern (Naja *et al.* 2013; Naja *et al.* 2011).

Similar to other studies, our results showed that the higher the education level of the mother the less likely the child is to follow the “sweet” pattern. (Craig, McNeill, Macdiarmid, Masson, and Holmes 2010; Nobre, Lamounier and Franceschini 2012; Northstone and Emmett 2005; Okubo *et al.* 2012; Ovaskainen *et al.* 2009). Studies has shown that children whose parents have lower education level have higher risk of obesity (Huerta, Bibi, Haviv, Scharf and Gdalevich 2006; Varo *et al.* 2003). Furthermore, adolescence with higher educated parents is less likely to have irregular meals, have energy-dense foods and sedentary lifestyle as compared to those from low educational families (Varo *et al.* 2003). This positive association between education level and healthy lifestyle is well known. Possible explanation for this is that well educated people report better self-control of their lives and health. Sense of control over one's life is associated with better health. Well educated people tend to choose a healthier lifestyle such as less likely to smoke, are more likely to exercise and get health checkups more often (Ross and Wu 1995). In addition educated mothers are more aware of the benefits of healthy lifestyle and the consumption of fruits and vegetables and the health risks associated with poor nutritional habits seen in a western as well as the high sugar type of patterns. Altogether, this contributes to improving behavior and eating habits.

The presence of a paid helper was negatively associated with Lebanese pattern. Many households delegate food preparation to the helper, which is more likely to prepare non-Lebanese food. Furthermore, the monthly income of the family and the presence of paid helper are two factors that indicate the socio economic status of the household and both were negatively associated with the Lebanese pattern. In other words, the better the economic status of the family the less likely is the child to follow

the Lebanese pattern. In fact, Naja *et al.* (2011) reported a positive association between the western dietary pattern and the income among Lebanese adults.

In developed countries it has been shown in several studies that the higher the socio-economic status of the family the more likely they are to follow an unhealthy pattern. Studies has shown that low-SES groups in developed countries and high-SES groups in developing countries are at a higher risk than their counterparts to adopt an unhealthy eating (Chen *et al.* 2011; Murasko 2011; Shang *et al.* 2012). Studies from the Middle East showed that obesity and unhealthy eating is more common in children living in urban areas, especially children with higher SES (Chakar and Salameh 2006; Musaiger 2011). When comparing high SES and low SES in Lebanon and Syria Nasreddine *et al.* (2010) found that obesity is more common among those with high SES. This could be explained by the adaptation of Western unhealthy dietary practices among those with higher SES in developing countries (Ebbeling *et al.* 2002).

It is important to mention that the majority of the studies have shown that household income is positively associated with the “healthy eating pattern”. However all those studies were conducted in Western countries and data on dietary pattern in this age group in developing countries are limited (North and Emmett 2000; Northstone and Emmett 2005; Ovaskainen *et al.* 2009; Pryer and Rogers 2009).

The frequencies of breakfast consumption were found to be positively correlated with following the sweet pattern. This is in fact contradictory to many studies which report better eating habits and healthier bodyweight (Dubois *et al.* 2009). Possible mechanisms that mediate the link between breakfast skipping and increase in weight is the resulting increase in intake of high-energy snacks, decrease in healthy food consumption and larger meal portions for the rest of the day (Dubois *et al.* 2009; Lobstein *et al.* 2004; Newby 2007). Naja *et al.* (2011) reported significant association

between breakfast consumption and the traditional Lebanese pattern. However the association between breakfast skipping and childhood obesity is not always consistent. For instance in the Bogalus heart study, no link was found between skipping breakfast and increased risk of overweight or obesity (Nicklas *et al.* 1998) and Stralen *et al.* (2012) found no significant association between breakfast consumption and BMI. In addition, in our study it was not addressed what type of breakfast the child consumed. The majority might have been consuming breakfast associated with sweet pattern such as pancakes, puddings, cakes, hot chocolate, sweetened yoghurt, sahlab, jam or chocolate spread. All these were in the sweetened dairy and desert group, which was highly loaded on the sweet pattern. Last, it is important to address that children in this young age group rarely skip breakfast since at this age a mother imposes on her child breakfast eating and that the studies mentioned earlier are done on older age groups.

Children consuming fast food were less likely to follow the Lebanese pattern and children who were mostly fed by their grandparents (father side) were more likely to follow the sweet pattern. Grandparents are known to treat their grandchildren with sweets and other delights often associated with unhealthy eating. Another possible reason can be that the child does not like the cooking of the grandparents and as an alternative they would offer the child fast food such as nuggets, escalope, burger etc. Furthermore, the mother might be too shy to insist that her parents in law feed the child healthier alternative. In contrary, if her parents were feeding the child the mother would have more to say about it.

D. Adherence to Dietary Pattern and Odds of Obesity

Children belonging to the third tertile of the Lebanese pattern were found to have 70% lower risk of being overweight and obese when adjusted for age, sex and

other socio-demographic and lifestyle factors. This is accordance with other studies, which also found that the “Lebanese” and “Mediterranean” dietary pattern were protective against obesity. The “Mediterranean” dietary pattern is characterized by high intake of cereals, fruits, vegetables, legumes, nut, fish, high-fat dairy products, meat, red wine and olive oil as main source of fat very similar to the “Lebanese” pattern .

Schroder *et al.* (2004) found that with increased adherence to the Mediterranean dietary pattern the obesity risk decreased in men and women even after controlling for potential confounders, and therefore concluded that the traditional Mediterranean dietary pattern is inversely associated with BMI and obesity. Naja *et al.* (2012) found an inverse association between the traditional Lebanese pattern and obesity markers. The protective effect seen in the Lebanese pattern might be attributed to its components such as high intake of fruits and vegetables. Vergnaud *et al.* (2012) reported that maintaining the total energy intake constant and increasing fruit and vegetable intake can lead to reduced weight gain. In addition, the high intake of fibers from fruits, vegetables and legumes may also play a role. No significant association was seen between sweet pattern and obesity, however, it is important to draw the attention to the fact that the prevalence of overweight and obesity in this paper was very low (9.2%). Bahreynian *et al.* (2013) reported no association regarding western pattern and weight status of school boys. This may be partly explained by over-reporting the healthy dietary habits such as fruits and vegetable consumption among overweight children or adaptation of healthier behavior to control their weight. Any under-reporting of the unhealthy food consumption would decrease the association between unhealthy eating patterns and overweight and obesity.

E. Strength and Limitations

It is important to mention some of the limitations of this study. First, this is a cross-sectional study and one cannot establish clear causality between the dietary patterns and the obesity risk. Furthermore, data on children were collected from mothers and therefore a recall bias might have occurred. Mothers might have under reported or over reported the children dietary intake.

In addition, only one 24-hr recall was collected which might not be representative of the child usual intake because there are day to day variation in the diet and it relies on the mothers' memory. In fact, multiple 24-hour recalls over several days are required to assess usual long-term intake (Livingstone and Robson 2000).

This study is the first to address dietary patterns among 2-5 year old children in Lebanon and its association with obesity indices. The strength of this study relies on its nationally representative sample gathered from all over Lebanon, and the use of international guidelines in dietary and anthropometric assessments. This allows us to compare our data to other studies done in other countries. In addition, the interviews were done by nutritionists who were trained extensively before data collection in order to decrease interviewer errors. This study uses a relatively new approach to evaluate diet and obesity risk through dietary pattern technique in combination with the traditional approach of correlating macro and micronutrients with obesity risk. The advantage of the dietary pattern approach is that it takes to consideration the cumulative effect of multiple foods and recommending a dietary pattern rather than specific nutrients, which makes it much easier for people to interpret and apply to their lifestyle habit. Since dietary habits and preferences are established in early childhood, prevention is the best strategy to control weight (Muller *et al.* 2001). This study provides valuable

information by shedding light on areas that need to be addressed in planning intervention programs.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

The findings of this study strengthen the association between dietary pattern and obesity risk in preschool children. The literature has found correlation of healthy eating pattern and the decreased risk of obesity. The results of this study confirm that the Lebanese dietary pattern has a protective effect against obesity; however no significant associations were found regarding the sweet pattern and obesity risk. This might be attributed to the low prevalence of overweight and obesity among the children in the study and to over-reporting of healthy dietary habits among overweight children. In addition, several socio-demographic and lifestyle factors were found to be significantly associated with the dietary pattern.

The prevalence of childhood obesity is on the rise and studies have shown that childhood obesity increases the likelihood of adulthood obesity. Lebanon is undergoing nutritional transition and more people are adopting western lifestyle. Therefore, effort should be made for early implementation of healthy eating by recommending the traditional Lebanese pattern to children as early as in preschool age. Day cares should also be advised to serve mainly traditional Lebanese food to the children. It is at this age that food likes, dislikes and preferences are established and remain even in adulthood.

APPENDIX I

ARABIC QUESTIONNAIRE

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American University of Beirut
20 JUN 2012
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كلية العلوم الزراعية والغذائية
قسم التغذية وعلوم الغذاء

برنامج تغذوي مبني على أدلة للأمهات،

الرضع، والأطفال

(الجزء الأول من مشروع التغذية المبكرة والصحة في لبنان (ELNAHL)

إستبيان ١: عمر ٠-٢ سنوات

٢٠١٢

Institutional Review Board
American University of Beirut

21 JUN 2012

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رقم الاستمارة:

العينة الوطنية

البيانات التعريفية							
1.	المحافظة:	*					
2.	القضاء:	*	*				
3.	اسم المنطقة	*	*				
4.	رقم الجزيرة						
نتيجة الزيارة							
الزيارة الأولى	الزيارة الثانية	الزيارة الثالثة	نتيجة الزيارة	الزيارة الأولى	الزيارة الثانية	الزيارة الثالثة	نتيجة الزيارة
1	2	3	6. مغلق دائم	1	2	3	1. تمت المقابلة
1	2	3	7. خالي	1	2	3	2. تمت جزئياً
1	2	3	9. رفض المقابلة	1	2	3	4. لا يوجد شخص مؤهل
1	2	3	10. أخرى (حدد)	1	2	3	5. مغلق مؤقت
1	2	3	8. مستعمل لغير السكن	1	2	3	3. أُرجنت
مراحل العمل							
اسم الباحث:		التاريخ: 2012 / /		رقم الباحث: [] []			
اسم المراقب:		التاريخ: 2012 / /		رقم المراقب: [] []			
اسم المرمر:		التاريخ: 2012 / /		رقم مدخل البيانات: [] []			
اسم مدخل البيانات:		التاريخ: 2012 / /		رقم مدخل البيانات: [] []			

نتيجة الزيارة:

1. تمت المقابلة [] []
2. رفض المقابلة
3. أخرى (حدد): _____

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جدول المحتويات

4	الخصائص الديمغرافية للأسرة.....
4	الخلفية الإجتماعية والديمغرافية.....
7	وضع تنظيم الأسرة.....
8	معلومات عامة عن طفلك.....
9	الحصول على خدمات التغذية للرضع.....
10	ممارسة الرضاعة الطبيعية.....
14	التغذية التكميلية.....
14	سوائل غير حليب الثدي.....
15	الأطعمة الصلبة، الشبه صلبة، والظرية.....
19	المأخوذ الغذائي للطفل.....
21	الممارسات المتعلقة بتغذية الطفل.....
21	بيئة تناول الطعام.....
22	الممارسات المتعلقة بالتغذية.....
23	أسلوب حياة الأم.....
23	التدخين.....
23	استهلاك الكحول.....
24	النشاط البدني.....
26	النمط الغذائي للأم.....
28	معلومات الأم حول الرضاعة الطبيعية.....
30	المقاييس الأنثروبومترية.....
30	الطفل.....
30	الأم.....

2

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31المأخوذ الغذائي للأمم.....
33تفاصيل الإتصال لمزيد من المعلومات.....
33الباحثون الرئيسيون.....
33الباحثون المساعدون.....
33المراجع.....

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برنامج تغذوي مبني على أدلة للأمهات، الرضع، والأطفال

إسبانيان ١ : ٢-٠ سنوات

رقم الإستمارة:
التاريخ:
المنطقة:
إسم المُقَابِل:
النهار:
وقت بداية الإستمارة:

الخصائص الديمغرافية للأسرة

الخلفية الإجتماعية والديمغرافية

يضم هذا القسم أسئلة عامة تتعلق بك وبعائلتك.

1. ما هو تاريخ ميلادك؟ (اليوم/ الشهر/ السنة): _____

2. ما هو وضعك العائلي (الحالة الإجتماعية)؟

- (1) متزوجة (يرجى تحديد العمر عند الزواج): _____ سنة
(2) منفصلة عن زوجي
(3) مُطَلَّقة
(4) أرملة
(5) لا أريد الإجابة

3. هل عشت في بلد آخر لفترة طويلة من الزمن؟

(1) نعم، يرجى تحديد:

البلد

المدّة

(2) كلا

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4. ما هو المستوى التعليمي الأعلى الذي حقّقته؟

- (1) أميّة
- (2) أقرأ وأكتب
- (3) المدرسة الابتدائية
- (4) المدرسة المتوسطة
- (5) المدرسة الثانوية
- (6) دبلوم تقني/فني
- (7) الشهادة الجامعية
- (8) لا أريد الإجابة

5. هل تخصصت في إحدى المجالات المتعلقة بالصحة (الطب، علم الأحياء (البيولوجيا)، الصحة العامة، الصيدلة، إلخ.)؟

- (1) نعم (انتقل إلى السؤال 7)
- (2) كلا

6. هل تستمعين/تشاهدتين/تقرأين معلومات متعلقة بالصحة (الطب، علم الأحياء (البيولوجيا)، الصحة العامة، الصيدلة، إلخ.)؟

- (1) نعم (يرجى إعطاء تفاصيل): _____
- (2) كلا

7. ما هي المهنة التي تقومين بها؟

- (1) موظفة، دوام كامل
- (2) موظفة، دوام جزئي
- (3) عاطلة عن العمل، ولكن أبحث عن عمل
- (4) عاطلة عن العمل، وغير قادرة على العمل
- (5) لا أعمل
- (6) غير، يرجى التحديد (رَبِّة منزل، تلميذة، إلخ): _____

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5

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8. ما هو نوع العمل الذي تقومين به؟

(1) موظفة حكومية

(2) موظفة في القطاع الخاص

(3) صاحبة مصلحة أو مؤسسة خاصة، يرجى التحديد: _____

9. ما هو المستوى التعليمي الأعلى الذي حققه زوجك؟ (انتقل إلى السؤال رقم 11 إذا كانت الأم مطلقة،

منفصلة عن زوجها، أو أرملة)

(1) أمي

(2) يقرأ ويكتب

(3) المدرسة الابتدائية

(4) المدرسة المتوسطة

(5) المدرسة الثانوية

(6) دبلوم تقني/فني

(7) الشهادة الجامعية

(8) لا أريد الإجابة

10. ما هو نوع العمل الذي يقوم به زوجك؟

(1) لا يعمل

(2) موظف حكومي

(3) موظف في القطاع الخاص

(4) صاحب مصلحة أو مؤسسة خاصة، يرجى التحديد: _____

(5) متقاعد

(6) عاطل عن العمل، ولكن يبحث عن عمل

(7) عاطل عن العمل، وغير قادر على العمل

(8) لا أعرف

(9) لا أريد الإجابة

11. كم هي عدد السيارات التي تملكونها؟ _____

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6

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12. البيت الذي تعيشون فيه معظم أوقات السنة (أي البيت الشتوي) هو:

(1) ملك خاص (لك و/أو لزوجك)

(2) إيجار

(3) ملك أحد الأقارب

(4) ملك أحد الأصحاب

(5) لا أعرف

(6) لا أريد الإجابة

13. كم هو عدد الغرف في البيت الذي تعيشون فيه معظم أوقات السنة (باستثناء المطبخ، الحمام، الكراج، أو الشرفات (البلكون) المفتوحة)؟ _____

14. ما هو العدد الإجمالي للأفراد في منزلك (وهذا يشمل مساعدة المنزل، الأقارب، أو أفراد العائلة التي تعيش معكم على أساس دائم أو شبه دائم)؟ _____

وضع تنظيم الأسرة

15. عددي أولادك مع تحديد العمر (بالأشهر أو بالسنتين)، بلد الولادة، وما إذا كانوا يرتادون المدرسة (رسمية أو خاصة) أو الحضانة، أو يبقون في المنزل (الجدول 1).

الجدول 1: قائمة الأولاد في الأسرة

رقم الطفل	إسم الطفل	بلد الولادة	العمر (بالأشهر/السنتين)	المدرسة		غير
				رسمية	خاصة	

تأكد من تدوين كل المعلومات المتعلقة بكل طفل قبل الانتقال إلى طفل آخر. عند انتهاء تدوين الأطفال في العائلة، يرجى وضع
خط.

16. هل أنت حامل؟

(1) نعم

(2) كلا

17. هل تستخدمين أي وسيلة لمنع الحمل؟

(1) نعم (بُرجى تحديد الوسيلة المستخدمة): _____

(2) كلا

معلومات عامة عن طفلك

يضمّم هذا القسم أسئلة تتعلق بطفلك الذي يتراوح عمره بين ٠ - ٢ سنوات. (إذا كان هناك أكثر من ولد واحد في هذه الشريحة العمرية (بين ٠ - ٢ سنوات)، يجب الإستفسار عن الأصغر سنًا).

18. إسم الطفل: _____

19. ما هو جنس الطفل؟

(1) ذكر

(2) أنثى

20. ما هو تاريخ ميلاده/ها؟ _____ (اليوم/ الشهر/ السنة)

21. ما كان وزنه/ها عند الولادة؟ _____ كلغ

22. كم كان طوله/ها عند الولادة؟ _____ سنتم

23. ما هي طريقة ولادة طفلك؟

(1) ولادة طبيعية

(2) ولادة قيصرية

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American University of Beirut

21 JUN 2012

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8

24. عندما لا يكن طفلك مريضاً، ما هي عدد المرات التي تُخضعينه للمعاينة الطبيّة العاديّة؟

- (1) أبداً
- (2) مرّة في السنّة
- (3) مرّتين في السنّة
- (4) أكثر من ثلاث مرّات في السنّة

الحصول على خدمات التغذية للرضع

25. من برأيك هو أكثر شخص مناسب/ موثوق به ليعطيك نصائح حول تغذية طفلك؟

- (1) أفراد العائلة
- (2) الطّبيب
- (3) الممرضة
- (4) أخصائي التغذية
- (5) نفسي
- (6) لا أعرف
- (7) غير، يرجى التّحديد:

26. هل تعتقد أن وجود قائمة للمراجع والموارد المتاحة حول الخدمات المتعلقة بالرضع مفيدة للأمهات الجُدد؟

- (1) نعم
- (2) كلا

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American University of Beirut

21 JUN 2012

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ممارسة الرضاعة الطبيعية

27. هل قمتَ بإرضاع طفلكِ رضاعة طبيعية؟

(1) نعم (الرجاء الانتقال إلى السؤال 29)

(2) كلا

28. يرجى تحديد الأسباب الرئيسية لعدم ممارسة الرضاعة الطبيعية مع طفلكِ. (الجدول 2) ومن ثم إنتقلي إلى السؤال (38).

الجدول 2. الأسباب لعدم ممارسة الرضاعة الطبيعية

نعم	كلا	الأسباب الرئيسية
		(1) الإخراج
		(2) الخوف من الألم أو الإزعاج
		(3) التعب والإرهاق
		(4) الحاجة إلى المساعدة في تغذية طفلي
		(5) قلة النوم
		(6) قلة الأماكن العامة التي تُتيح الإرضاع
		(7) عدم وجود دعم من زوجي
		(8) عدم وجود دعم من العائلة
		(9) عدم وجود دعم من الأصدقاء
		(10) التشجيع على استخدام حليب البودرة من قبل العاملين في المستشفى (الأطباء، مقدمي الرعاية الصحية، والممرضات)
		(11) مشاكل في إنتاج الحليب
		(12) مشاكل طبية (ولادة قيصرية، مكثري، الخ.)
		(13) لا تحبين الإرضاع من الثدي
		(14) لم يقبل الطفل الثدي
		(15) كان عليك أن تعلمي
		(16) غير، يرجى التحديد:

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American University of Beirut

10

21 JUN 2012

APPROVED

29. خلال مرحلة رضاعة طفلك، ماذا حصل لدورتك الشهرية؟
- (1) توقفت كلياً (يرجى تحديد الفترة): _____ أشهر
 - (2) توقفت لفترة محدودة، ولكنها قد عاودت حالياً (يرجى تحديد الفترة): _____ أشهر
 - (3) لم تتوقف ابداً

30. لماذا اخترت الرضاعة الطبيعية؟ (اخترى كل ما ينطبق عليك)

- (1) فوائد صحية لنفسى
- (2) فوائد صحية لطفلي
- (3) شجعتني تجاربي السابقة في الرضاعة الطبيعية
- (4) ارتفاع كلفة حليب البودرة للأطفال
- (5) نصيحة الطبيب
- (6) نصيحة العائلة
- (7) جميع الخيارات الواردة أعلاه

31. كم من الوقت إنتظرت قبل أن وضعت طفلك على الثدي بعد الولادة؟

- (1) مباشرة (بعد أن مضى أقل من ساعة بعد الولادة)
- (2) ساعة
- (3) أقل من 24 ساعة (_____ ساعة)
- (4) _____ أيام
- (5) لا أتذكر

32. كم من الوقت قام طفلك:

- (1) بالرضاعة الطبيعية المطلقة _____ (أشهر)
- (2) بالرضاعة الطبيعية _____ (أشهر)
- (3) لا زلت أرضع (انتقلي إلى السؤال 34)

33. لماذا توقفت عن إرضاع طفلك من الثدي؟ (اختاري كل ما ينطبق في الجدول 3)

الجدول 3. الأسباب لوقف الرضاعة الطبيعية

كلا	نعم	الأسباب الرئيسية
		(1) الإحراج
		(2) الألم أو الإزعاج (من التهاب الثدي مثلاً)
		(3) التعب والإرهاق
		(4) الحاجة إلى المساعدة في تغذية طفلي
		(5) قلة النوم
		(6) قلة الأماكن العامة التي تُتيح الإرضاع
		(7) عدم وجود دعم من زوجي
		(8) عدم وجود دعم من العائلة
		(9) عدم وجود دعم من الأصدقاء
		(10) التشجيع على استخدام حليب البودرة من قِبل العاملين في المستشفى (الأطباء، مقدمي الرعاية الصحية، والممرضات)
		(11) مشاكل في إنتاج الحليب
		(12) مشاكل طبيعية (ولادة قيصرية، سكري، الخ.)
		(13) لا تحبين الإرضاع من الثدي
		(14) لم يقبل الطفل الثدي
		(15) كنت مريضة
		(16) كان عليك أن تعلمي
		(17) حملت ثانية
		(18) حليب الثدي غير كافٍ لاشباع طفلي
		(19) عُمر الطفل، يرجى التحديد:
		(20) غير، يرجى التحديد:

34. كل مرة تمارسين الرضاعة الطبيعية، هل:

- (1) تعطي طفلك حليب من ثدي واحد فقط
- (2) تحاولي أن تعطي طفلك حليب من الثديين
- (3) تعطي طفلك حليب من الثديين فقط إذا إنتهي الطفل من الثدي الأول وما يزال جائعاً

Institutional Review Board
American University of Beirut

12

21 JUN 2012

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35. كيف يحصل طفلك على حليب الثدي؟

- (1) من الثدي مباشرة (فترة الرضاعة من الثدي الواحد _____ دقائق)
- (2) من قنينة (عدد القناني في اليوم _____ . الرجاء تحديد مقدار القنينة _____ ملل)
- (3) من ملعقة (عدد الملاعق في اليوم _____)
- (4) من كوب (عدد الأكواب في اليوم _____ . الرجاء تحديد مقدار الكوب _____ ملل)

36. عندما كان طفلك يبلغ أقل من 6 أشهر من العمر، هل كنت تعطيه/ها حليب البودرة الخاص بالأطفال بالإضافة إلى الرضاعة الطبيعية؟

- (1) نعم
 - i. متى بدأت بإعطاء حليب البودرة الخاص بالأطفال _____ (عمر الطفل بالأشهر)
 - ii. عدد وجبات حليب البودرة المُعطاة في القنينة في اليوم الواحد _____
 - iii. عدد مرّات الرضاعة الطبيعية في اليوم الواحد _____
- (2) كلا

37. عندما أعطيت طفلك حليب البودرة الخاص بالأطفال، هل قمت بإضافة أي من المواد التالية أدناه:

- (1) حبوب الإفطار الخاصة بالأطفال (سيربلاك، Blédine، بودرة الأرز، الخ.)
- (2) السكر
- (3) بودرة الشوكولا
- (4) العسل
- (5) غير، يرجى التحديد: _____
- (6) لم أضف شيئاً
- (7) لا أتذكر

38. هل وفر/ يوفّر لك زوجك الدعم الإيجابي (انتقل إلى السؤال رقم 39 إذا كانت الأم مطلقة، أو منفصلة عن زوجها، أو أرملة)

- (1) نعم
- (2) كلا

39. كيف وفّرت لك المستشفى أو العيادة الدّعم بخصوص إرضاع طفلك؟

- (1) أنجبت طفلي في المنزل
- (2) تشجيع إيجابي من قبل العاملين في المستشفى (الأطباء، مقدّمي الرّعاية الصّحية، والممرضات)
- (3) مُحايدة
- (4) عدم تشجيع من قبل العاملين في المستشفى (الأطباء، مقدّمي الرّعاية الصّحية، والممرضات)
- (5) تشجيع على تغذية طفلي من حليب البودرة الخاص بالأطفال

13

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American University of Beirut

21 JUN 2012

APPROVED

40. بعد الولادة وخلال وجودك في المستشفى، هل أعطي طفلك أي سوائل خلال ٣ أيام من بعد الولادة؟

(1) نعم

(2) كلا

التغذية التكميلية

سوائل غير حليب الثدي

41. من السوائل التي سنذكرها، أشيري إلى السوائل التي يتناولها طفلك، وأذكرني الوقت الذي بدأت بإدخال هذه السوائل. (الجدول 4).

الجدول 4: إدخال سوائل التغذية التكميلية

وقت إدخال السوائل إلى النظام الغذائي (عمر الطفل بالأشهر)	لا أعرف	كلا	نعم	السوائل
				(1) الماء العادي
				(2) الماء العادي (مع إضافة السكر، ماء الورد، وغيرها) الرجاء التحديد:
				(3) حليب البودرة الخاص بالأطفال
				(4) حليب البقر (البودرة، أو السائل) الرجاء تحديد النوع:
				(5) العصير أو مشروبات العصير
				(6) المرققة
				(7) اللبن
				(8) أي سوائل أخرى (مثل اليانسون، الشاي، البابونج، الكراويا)
				(9) أي سوائل أخرى، الرجاء التحديد:

Institutional Review Board
American University of Beirut

14

21 JUN 2012

APPROVED

الأطعمة الصلبة، الشبه صلبة، والظرية

42. هل قمت بادخال الأطعمة الصلبة والشبه صلبة؟

- (1) نعم
(2) كلا (انتقلي الى سؤال 49)

43. ما كان أول طعام صلب قدمته لطفلك؟

44. متى قدمته لأول مرة؟ (عمر الطفل بالأشهر):

45. لماذا بدأت بتقديم الأطعمة الصلبة في ذلك الوقت؟ (ينبغي إختار كل ما ينطبق)

- (1) التقليد العائلي
(2) كان طفلي لا يزال يشعر بالجوع بعد تناول الحليب
(3) كان طفلي يبكي باستمرار
(4) كان طفلي في السن المناسب لذلك
(5) لم يكن طفلي ينام خلال الليل
(6) كان طفلي مريضاً
(7) كان طفلي يرفض الحليب
(8) كان طفلي مهتماً بالأطعمة/ فطم نفسه
(9) لم يكن وقت إطعام طفلي يتلائم مع جدول العمل الخاص بي
(10) حملت ثانية
(11) ما من سبب محدد غير، يُرجى التحديد:

46. من الأطعمة التي سوف نذكرها، يرجى تحديد إذا كنت قد بدأت بإدخال أي من الأطعمة إلى النظام الغذائي الخاص بطفلك. يُرجى تحديد الوقت الذي بدأت بإدخال هذه الأطعمة. (الجدول 5).

الجدول 5: توقيت إدخال الأطعمة التكميلية الصلبة

وقت إدخال الطعام إلى النظام الغذائي (عمر الطفل بالأشهر)	لا أعرف	كلا	نعم	الأطعمة التكميلية الصلبة
				(1) الخبز، القمح، البرغل، الأرز، المعكرونة، أو غيرها من الأطعمة المصنوعة من الحبوب
				(2) حبوب الإفطار الخاصة بالأطفال (سيرلاك، بليدين، الخ.)
				(3) الجزر، الكوسى، البطاطا الحلوة (الصفراء أو البرتقالية من الداخل)، اليقطين
				(4) البطاطا
				(5) أي من الخضار الورقية الخضراء الداكنة (سبانخ، ملوخية، إلخ)
				(6) أي من أنواع الخضار الأخرى
				(7) المانجو، الجريب فروت، البندورة، البطيخ
				(8) أي من أنواع الفواكه الأخرى
				(9) لحوم الكبد، الكلى، القلب، وغيرها من لحوم الأعضاء
				(10) اللحوم مثل لحم البقر، الخنزير، الخروف، الماعز، الدجاج
				(11) البيض
				(12) السمك، المحار أو المأكولات البحرية الطازجة أو المجمدة
				(13) البقول (عدس، حمص، فول، فاصوليا، وغيرها)
				(14) المكسرات والبذور
				(15) الجبن، اللبن، أو غيرها من منتجات الحليب
				(16) أطعمة الأسرة (اليخنة، الخضار المحشوة، الخ.)
				(17) الزيوت، الدهون، أو الزبدة، أو الأطعمة المصنوعة منها
				(18) أي أطعمة سكرية مثل الشوكولا، الحلويات، الكيك، أو البسكويت
				(19) الحلويات العربية (بقلاوة، معمول، نمورة، إلخ)
				(20) حلويات أخرى (مغلي، أرز بالحليب، مهلبية، كسترد، إلخ)
				(21) المربى، الجلو
				(22) العسل
				(23) توابل للنكهة مثل الفلفل الحار، البهارات، الأعشاب، بالإضافة إلى الخردل، الكتشاب، وصلصة الصويا
				(24) المواد الغذائية المدعمة بالحديد (حبوب الإفطار، الحليب، الخ.)

47. أذكر عدد الحصص لكل من المجموعات الغذائية التالية التي يتم استهلاكها من قبل طفلك (في اليوم، في الأسبوع، أو في الشهر) (الجدول 6)

الجدول 6: نظرة عامة على استهلاك الطفل للمجموعات الغذائية الرئيسية

عدد الحصص				المجموعة الغذائية
أبدأ	في الشهر	في الأسبوع	في اليوم	
				(1) الفواكه
				(2) الخضار
				(3) الخبز والحبوب
				(4) اللحوم (أي اللحوم الحمراء، السمك، والدجاج)
				(5) لحوم الأعضاء (أي الكبد، الكلى، القلب، الخ.)
				(6) البقول (أي الفاصوليا، العدس، الحمص، إلخ.)
				(7) المكسرات (المملحة وغير مملحة)
				(8) الحليب ومنتجاته (أي الحليب، اللبن، الجبن، واللبننة)
				(9) الحلويات

17

Institutional Review Board
American University of Beirut

21 JUN 2012

APPROVED

48. أذكر عدد المرات (في اليوم، في الأسبوع، في الشهر) التي يستهلك فيها طفلك أحد الأصناف التالية (الجدول 7).

الجدول 7: وتيرة استهلاك الوجبات الخفيفة والمشروبات من قبل الأطفال

وتيرة الإستهلاك			الأصناف
في الشهر	في الأسبوع	في اليوم	
			(1) رقائق البطاطا (شيبس)
			(2) شوكولا
			(3) بون بون
			(4) بسكويت/كوكيز
			(5) بوظة/آيس كريم/ بوظة على ثلج
			(6) بطاطا مقلية
			(7) هوت دوغ
			(8) همبرغر
			(9) بيتزا
			(10) كيك، كيك المافين، الكابريك
			(11) بانكيك
			(12) دونتس
			(13) حبوب الافطار المحلاة
			(14) عصير الفاكهة 100% طبيعي (بالإضافة إلى العصير المُحضّر في المنزل)
			(15) عصير الخضار 100% طبيعي (بالإضافة إلى العصير المُحضّر في المنزل مثل عصير البندورة والجزر، الخ.)
			(16) مشروبات الفواكه (عصير الفواكه المحلي، عصير بطعم الفواكه-طبيعي أو اصطناعي، أو مشروب مع بعض الفاكهة)
			(17) المشروبات الغازية العادية
			(18) مشروبات الدايت/القليلة بالسعرات الحرارية = المشروبات الغازية الدايت، الشاي أو المشروبات الغازية المحلاة بواسطة المحلي
			(19) الحليب المحلي (أعطي مثلاً)
			(1) كامل الدسم
			(2) قليل الدسم

18

Institutional Review Board
American University of Beirut

21 JUN 2012

APPROVED

المأخوذ الغذائي للطفل

الرجاء تذكر ما أكله الطفل وشربه منذ أن استيقظ أمس حتى صباح اليوم التالي (قبل الإفطار). تحديد توقيت تناول الوجبات بما فيها:

- الإرضاع من الثدي
- حليب البودرة الخاص بالأطفال
- حليب البقر
- السوائل الأخرى
- الأطعمة الصلبة

طريقة التحضير	الكمية	الطعام	الوقت

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هل هذا هو نمط طفلك المعتاد لتناول الطعام؟

(1) نعم

(2) كلا

إذا كان الجواب كلا، لماذا؟

20 Institutional Review Board
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21 JUN 2012

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الممارسات المتعلقة بتغذية الطفل

بيئة تناول الطعام

49. هل لديك مساعدة في المنزل؟

- (1) نعم
- (2) كلا

50. في العادة، تقع مسؤولية إطعام (تغذية) طفلك:

- (1) عليك أنتِ
- (2) على زوجك
- (3) على والديك
- (4) على والدي زوجك
- (5) على مساعدتك
- (6) غير، يُرجى التحديد

51. ما هي الوجبة الرئيسية التي يتناولها أفراد العائلة سوياً؟

- (1) وجبة الفطور
- (2) وجبة الغذاء
- (3) وجبة العشاء
- (4) لا تتشارك العائلة في أي وجبة

52. هل يتناول طفلك الوجبة الرئيسية مع العائلة؟

- (1) دائماً
- (2) أحياناً
- (3) أبداً

53. عندما تطعمين طفلك، هل يكون التلفزيون شغلاً في الغرفة نفسها؟

- (1) دائماً
- (2) غالباً
- (3) أحياناً
- (4) نادراً
- (5) أبداً

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21 JUN 2012

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21

أسلوب حياة الأم

التدخين

59. هل تدخنين الآن أو سبق لك أن دخنت سابقاً؟

- (1) نعم، أدخن حالياً
- (2) كنت أدخن وتوقفت
- (3) كلا (انتقلي الى السؤال رقم 64)
- (4) لا أريد الإجابة

60. كم كان عمرك عندما بدأت التدخين؟

- (1) العمر بالسنوات: _____
- (2) لا أعرف
- (3) لا أريد الإجابة

61. إذا كنت تدخنين حالياً، كم من الخيارات التالية تدخنين؟

- (1) سيجارة في اليوم الواحد _____
- (2) سيجار في اليوم الواحد _____
- (3) ساعة من تدخين النرجيلة في اليوم الواحد _____

62. هل دخنت خلال فترة الحمل؟ (حملك بطفلك المشارك في هذه الدراسة)

- (1) نعم
- (2) كلا

63. هل دخنت خلال فترة إرضاع طفلك رضاعة طبيعية (طفلك المشارك في هذه الدراسة)؟

- (1) نعم
- (2) كلا
- (3) لم أرضع طفلي رضاعة طبيعية

استهلاك الكحول

64. هل تشربين الكحول حالياً؟

- (1) نعم
- (2) كلا

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American University of Beirut

21 JUN 2012

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65. هل شربت الكحول خلال فترة الحمل؟ (حملك بطفلك المشارك في هذه الدراسة)
1) نعم، (يُرجى تحديد كمية الكحول المستهلكة): _____ (اليوم أو /الأسبوع)
2) كلا

66. هل شربت/ هل تشربين الكحول عند إرضاع طفلك المشارك في هذه الدراسة؟
1) توقفتُ عن إستهلاك الكحول خلال فترة الرضاعة
2) خففتُ من إستهلاك الكحول خلال فترة الرضاعة
3) تابعت إستهلاك الكحول كالعادة، حتى ولو إنني مُرضِعة

النشاط البدني

يضم هذا القسم أسئلة تتعلق بنشاطك البدني.

67. خلال الأيام السبعة الماضية، كم عدد المرات في اليوم التي قمتِ بممارسة نشاط بدني مكثف (مثل رفع الأشياء الثقيلة، الحفر في الحديقة، تمارين الأيروبيك، أو ركوب الدراجة بسرعة)؟ فكر في الأنشطة البدنية التي مارستها لفترة لا تقل عن 10 دقائق كل مرة. وهذه الأنشطة البدنية يمكن أن تشمل لقطات قصيرة من النشاط البدني خلال النهار، مثل تسلق الدرج، تنظيف المنزل، القيام بالغسيل، واللعب مع الأولاد.

- 1) _____ أيام في الأسبوع
2) لم أمارس أي نشاط بدني مكثف (انتقلي الى السؤال رقم 69)

68. كم من الوقت قمتِ بممارسة نشاط بدني مكثف في إحدى تلك الأيام؟

- 1) _____ ساعة في اليوم
2) _____ دقيقة في اليوم
3) لا أدري / غير متأكدة

69. خلال الأيام السبعة الماضية، كم عدد المرات في اليوم التي قمتِ بممارسة نشاط بدني معتدل (مثل رفع الأشياء الخفيفة، تسلق الدرج، تنظيف المنزل، القيام بالغسيل، اللعب مع الأولاد، ركوب الدراجة بوتيرة منتظمة، أو لعب التنيس. لا تشمل المشي في جواربك)؟ فكر في الأنشطة البدنية التي مارستها لفترة لا تقل عن 10 دقائق كل مرة.

- 1) _____ أيام في الأسبوع
2) لم أمارس أي نشاط بدني معتدل (انتقلي الى السؤال رقم 71)

70. كم من الوقت قمتِ بممارسة نشاط بدني معتدل في إحدى تلك الأيام؟
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American University of Beirut 24

21 JUN 2012

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- (1) _____ ساعة في اليوم
 (2) _____ دقيقة في اليوم
 (3) لا أدري / غير متأكّدة

71. خلال الأيام السبعة الماضية، كم عدد المرّات في اليوم التي قمتِ بممارسة المشي (وهذا يشمل في المنزل وفي العمل، المشي للتنقل من مكان إلى مكان، وأي نشاط قائم على المشي لهدف الرياضة أو الإستجمام)؟ فكر في فترات المشي التي مارستها لفترة لا تقل عن 10 دقائق كل مرة.

- (1) _____ أيام في الأسبوع
 (2) لم أمارس المشي (إنّقلي الى السؤال رقم 73)

72. كم من الوقت قمتِ بممارسة المشي في إحدى تلك الأيام؟

- (1) _____ دقيقة/ساعة في اليوم.
 (2) لا أدري / غير متأكّدة

73. خلال الأيام السبعة الماضية، كم من الوقت قضيتيه جالسة خلال أيام الأسبوع؟ (وهذا يشمل الوقت في المكتب، في المنزل إثناء القراءة أو مشاهدة التلفزيون ، أو عند زيارة الأصدقاء). (لا يشمل هذا النوم)

- (1) _____ ساعة في اليوم
 (2) _____ دقيقة في اليوم
 (3) لا أدري / غير متأكّدة

النمط الغذائي لدى الأم

74. هل تتناولين الإفطار كل يوم؟

- (1) نعم
 (2) كلا

75. كم وجبة طعام تتناولين في اليوم من أصل وجبات الطعام الرئيسية الثلاث؟
 وجبة/وجبات في اليوم _____

76. هل تتبعين حالياً حمية غذائية معينة؟

- (1) نعم

i. نوع الحمية الغذائية _____

ii. سبب متابعة هذه الحمية الغذائية _____

- (2) كلا

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21 JUN 2012

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٢. هل أنت نباتية؟

(1) نعم

(2) كلا

٣. من يُعدّ معظم وجبات الطعام في منزلك؟

(1) أنا

(2) زوجي

(3) أهلي

(4) أهل زوجي

(5) مساعدتي

(6) غيري، يُرجى التحديد: _____

٤. كم مرة في الأسبوع تقومين أنت وعائلتك:

(1) بشراء الوجبات الجاهزة (الوجبات السريعة، المناقيش، إلخ.) _____

(2) بتناول الطعام في المطاعم _____

٥. ما هي الدهون/الزيوت التي تستعملينها عادة في الطبخ (يمكن إختيار أكثر من إجابة):

(1) زبدة _____

(2) المارجرين _____

(3) السمن (النباتي أو الحيواني) _____

(4) زيت النخيل/زيت جوز الهند _____

(5) زيت الزيتون _____

(6) زيت الكانولا _____

(7) زيوت نباتية أخرى _____

٦. ل تتناولين أي من المكملات الغذائية؟

(1) نعم، يرجى تحديد ما هي المكملات الغذائية التي تتناولين

i. الفيتامينات: الإسم: _____ الكمية المُستهلكة/اليوم: _____

ii. المعادن: الإسم: _____ الكمية المُستهلكة/اليوم: _____

iii. الأعشاب: الإسم: _____ الكمية المُستهلكة/اليوم: _____

(2) كلا

معلومات الأم حول الرضاعة الطبيعية

82. هل تم إرضاعك من الثدي عندما كنت طفلة؟

(1) نعم

(2) كلا

الجدول 8. معلومات الأم حول الرضاعة الطبيعية

كلا	نعم	الأسئلة
		1. الرضاعة الطبيعية تؤدي إلى إنقطاع الدورة الشهرية
		2. يشكل حليب الثدي غذاءً كاملاً للطفل. وليس هناك حاجة إلى أي مواد غذائية إضافية، أو سوائل وفيتامينات، إلخ. إلا عندما يصبح الطفل على مقربة من السنة الأولى من العمر
		3. إذا كانت لديك ثديان صغيران، من الممكن أن يكون حليبك غير كافٍ لرضاعة طفلك
		4. إذا أصيبت الأم بالمرض (مثل الزكام أو الإنفلونزا)، يمكنها متابعة ممارسة الرضاعة الطبيعية مع طفلها
		5. الأطفال الذين يتم إرضاعهم من الثدي هم أقل عرضة للحساسية من الأطفال الذين يستهلكون حليب البودرة الخاص بالأطفال
		6. حبوب منع الحمل هي الطريقة المثلى لتجنب الحمل خلال فترة الرضاعة الطبيعية
		7. يجب أن لا تحاولي رضاعة طفلك رضاعة طبيعية إن كنت عازمة على العودة إلى العمل أو الدراسة، إذ أنك لن تستطيعين التواجد دائماً مع طفلك لرضاعته/ها
		8. كلما مارست الرضاعة الطبيعية، كلما زادت كمية الحليب لرضاعة طفلك
		9. الأطفال الذين يتم إرضاعهم من الثدي هم أقل عرضة للإلتهابات من الأطفال الذين يستهلكون حليب البودرة الخاص بالأطفال
		10. الكثير من النساء غير قادرين على تأمين كميات كافية لأطفالهن

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27

2 1 JUN 2012

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إختاري الجواب الأنسب للأسئلة التالية:

إن أفضل غذاء للطفل المولود هو:

- (1) حليب الثدي (حليب الأم)
- (2) حليب البودرة الخاص بالأطفال
- (3) حليب الثدي والمياه
- (4) حليب الثدي مع حليب البودرة المخصّص للأطفال

عندما تمارسين الرضاعة الطبيعية:

يمكنك إسترجاع شكل جسمك الأساسي قبل الحمل بسهولة أكثر
على الأرجح سوف تزيد نسبة وزنك
قد تشعرين بتعب (ضعف)

إذا مارست الرضاعة الطبيعية:

لا أحد يستطيع مساعدتك مع طفلك لأنك ملزمة برضاعته/ها
سوف تقضين وقتاً أطول بإطعام طفلك مقارنة مع إذا أعطيت طفلك حليب البودرة الخاص بالأطفال
سوف تواجهين مشكلة بإطعام طفلك في الأماكن العامة
كل الخيارات أعلاه غير صحيحة

الرضاعة الطبيعية:

قد تؤدي إلى إرتخاء الثديين
قد تؤدي إلى إرتفاع في حجم الثديين بعد التوقف عن الرضاعة الطبيعية
لا تؤثر على حجم أو شكل الثديين

ما هي المدة المثلى للرضاعة الطبيعية (بالأشهر)؟

- (1) 3 أشهر
- (2) 6 أشهر
- (3) 12 شهر
- (4) حتى السنتين من العمر

لمزيد من المعلومات، يُرجى الاتصال بمن يلي:

الباحثون الرئيسيون:

الدكتورة نهلا حولاً، كلية العلوم الزراعية والغذائية، الجامعة الأميركية في بيروت

هاتف: 961-1-350000، تحويلة (4400)، البريد الإلكتروني: nahla@aub.edu.lb

الدكتورة لارا نصر الدين، كلية العلوم الزراعية والغذائية، الجامعة الأميركية في بيروت

هاتف: 961-1-350000، تحويلة (4547)، البريد الإلكتروني: ln10@aub.edu.lb

الباحثون المساعدون:

الدكتورة فرح نجا، كلية العلوم الزراعية والغذائية، الجامعة الأميركية في بيروت

هاتف: 961-1-350000، تحويلة (4504)، البريد الإلكتروني: fn14@aub.edu.lb

الدكتورة دينا زيبان، كلية العلوم الزراعية والغذائية، الجامعة الأميركية في بيروت

هاتف: 961-1-350000، تحويلة (4429)، البريد الإلكتروني: dz12@aub.edu.lb

المراجع:

Grossman, LK, Harter, C & Hasbrouck, C 1990, 'Testing mothers' knowledge of breastfeeding: instrument development and implementation and correlation with infant feeding decision', *J Pediatr Perinat Nutr*, vol. 2, no. 2, pp. 43-63.

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American University of Beirut

33

21 JUN 2012

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APPENDIX II

CONSENT FORM

“Evidence –Based Nutrition Program for Women, Infants and Young Children”

Protocol number:

Script to be used for the recruitment of **mother and child (under-five)** pair.

Hello, my name is _____, I am part of a research team at the American University of Beirut. We are conducting a research study that investigates the nutrition status of Lebanese children (under-five) and their mothers; this includes feeding and dietary lifestyle patterns. Your participation in this study involves answering some questions through an interview that will take around 60 minutes from your time. You have the right to refuse to participate in this study and to decline to answer particular questions. Please understand that your participation is voluntary and you have the right to refuse or discontinue participation at any time without penalty. All the information that I receive from you will be treated with strict confidentiality and will be kept under lock and key.

Would you like to consider participating in this study? Yes/No
If the answer is no, can you please tell us why? _____

For you to be eligible to participate in this study, we have a couple of questions to ask you.

Questions	Yes	No	Comments
Do you hold a Lebanese passport?			
Do you have a child aged under-five years old?			
Was your child's gestational age at birth ≥ 37 weeks			
Does the child have any medical problems that may affect his/her normal growth? (GI complications, respiratory illness, inborn errors, malformations or others)			
Is your child present in the house today?			
Are you taking medications that may interfere with your eating patterns or body weight?			
Do you have any chronic illness (Diabetes; CVD etc)?			

Contact Information and Questions

If you have any questions or concerns about the research you may contact:

Dr. Lara Nasreddine, Faculty of Agricultural & Food Sciences-AUB
Tel: 961-1-350000 (Ext 4547) **E-mail:** ln10@aub.edu.lb

Dr. Farah Naja, Faculty of Agricultural & Food Sciences-AUB
Tel: 961-1-350000 (Ext 4504) **E-mail:** fn14@aub.edu.lb

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Dr. Dina Zebian, of Agricultural & Food Sciences-AUB
Tel: 961-1-350000 (Ext 4429) E-mail: dz12@aub.edu.lb

If you have any questions, concerns or complaints about your rights as a participant in this research, you can contact the following office at AUB:

Social & Behavioral Sciences Institutional Review Board

Address: American University of Beirut; Riad El Solh, Beirut 1107 2020, Lebanon

Tel: 00961 1 374374, ext: 5445 Email: irb@aub.edu.lb

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6 5 JUN 2008

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إستمارة موافقة

عنوان الدّراسة البحثية: برنامج تغذية للرّضع، الأطفال وأمّهاتهم.

الجزء الأوّل: من مشروع "التغذية والصحة المبكرة في الحياة في لبنان"

الباحثون الرّئيسيون:

الدكتورة لارا نصر الدين- قسم التغذية وعلوم الغذاء، الجامعة الأميركية في بيروت.

الدكتورة نهلا حوتلا- قسم التغذية وعلوم الغذاء، الجامعة الأميركية في بيروت.

الباحثون المساعدون:

الدكتورة فرح نجا- قسم التغذية وعلوم الغذاء، الجامعة الأميركية في بيروت.

الدكتورة دينا زبيان- قسم التغذية وعلوم الغذاء، الجامعة الأميركية في بيروت.

أنتِ مدعوّة للمشاركة في دراسة بحثية يُجرىها قسم التغذية وعلوم الغذاء في الجامعة الأميركية في بيروت. من المهمّ أن تقرأ المعلومات المذكورة أدناه بعناية قبل الموافقة على المشاركة في الدّراسة، من أجل فهم الأهداف، الإجراءات، الفوائد والأخطار المرتبطة بمشاركةك بهذا المشروع. لا تتردّدي في طرح الأسئلة إذا كنتِ بحاجة إلى توضيح حول ما ورد في هذه الإستمارة أو إذا كنتِ بحاجة إلى أي معلومات إضافية.

أهداف الدّراسة:

تهدف هذه الدّراسة إلى تقييم الوضع الغذائي للأطفال دون سنّ الخامسة وأمّهاتهم. من خلال استخدام استبيانات معيّنة، سيهدف المشروع إلى تقييم النظام الغذائي المعتاد والممارسات الغذائية وأنماط الحياة الخاصة بالرّضع والأطفال والأمّهات. ويُعدّ هذا أمراً مهماً لأنّ الدراسات التي أجريت مؤخراً أظهرت أن الوضع الغذائي للأم والتغذية في وقت مبكر في الحياة يمكن أن يأتزان بشكل كبير على مخاطر الإصابة بأمراض مُزمنة في وقت لاحق في الحياة. وبالتالي، ستسمح لنا هذه الدراسة بتحديد القضايا الغذائية الأساسية في مرحلة الطفولة المبكرة. كما ستساهم في تطوير استراتيجيات موجهة نحو معالجة النقص الغذائي لدى الأم والرضيع والطفل الصغير، ونحو معالجة الممارسات الغذائية الخاطئة والسائدة في وقت مبكر في الحياة (والتي تشكّل مرحلة حاسمة لبقاء الطفل على قيد الحياة ونشأته ونموّه بشكل سليم وصحيّ في المستقبل).

وصف المشروع ومدّته

سيتمّ تنفيذ هذا المشروع من خلال جمع عيّنة ممثلة للسكان على الصعيد الوطني ومؤلفة من 1030 أمّ وأطفالهنّ دون سنّ الخامسة (1030 ثنائي مؤلف من أمّ وطفل) من أسر من المحافظات الستّة في لبنان.

إذا وافقتِ على المشاركة في هذه الدّراسة، ستتمّ مقابلتك في منزلك أو في مكان آخر إذا كنتِ ترغبين بذلك. سوف تستغرق المقابلة حوالي ساعة واحدة من وقتك.

سيتمّ طرح أسئلة عليك تتعلق بالممارسات الغذائية الخاصة بطفلك (الرضاعة والتغذية التكميلية)، النظام الغذائي الخاصّ بك، بالإضافة الى معلومات متعلّقة بإعداد وجبة الطعام ومدى معرفتك حول تغذية الطفل وأنماط الحياة.

سوف يُطلب منك أيضاً تقديم إستمارة عن النظام الغذائي الخاصّ بك وبطفلك على مدى 24 ساعة، يقضي بذكر ما تمّ استهلاكه من أطعمة ومشروبات خلال الـ 24 ساعة الماضية.

سيتمّ أيضاً الحصول على قياس وزنك، طولك ومحيط خصرك فضلاً عن قياس وزن طفلك، طوله، محيط رأسه ومحيط النصف الأعلى من ذراعه.

المخاطر، المشاكل والفوائد

ليس هناك مخاطر كبيرة ناتجة عن مشاركتك في هذه الدراسة. قد تزعجك بعض الأسئلة التي سنطرحها عليك ويمكنك ألا تجيب عليها إذا أردت. ستحصلين على استشارة غذائية خاصّة بك وبطفلك عند الإنتهاء من المقابلة. كما سيحصل طفلك على لعبة لمشاركته في هذه الدراسة. وسوف يحصل طفلك على هذه اللعبة حتّى إذا قرّرت التوقف عن إكمال الدراسة.

السريّة

إنّ المعلومات التي ستوقرينها ستبقى في غاية السريّة. لن يُسجّل اسمك على الاستبيان. فقط أعضاء فريق البحث سيتمكنون من الحصول على الإستيبيانات التي ستستعمل لأهداف بحثيّة فقط لا غير. لن يتمّ الإبلاغ عن اسمك عند نشر نتائج البحث. وسيتمّ خزن الإستيبيانات التي تمّ ملؤها في خزانة في مكتب المسؤول. كما سيتمّ حفظ نسخ إلكترونية من البيانات والتأمين عليها بكلمة سرّ.

الرجاء أن تعلمي بأنّ مشاركتك في هذه الدراسة طوعية تماماً ويحقّ لك التوقف عن ذلك في أي وقت من دون الخضوع لأي عقوبة. وإذا قرّرت عدم المشاركة، فلن يؤثر ذلك بأي شكل من الأشكال على علاقتك بالجامعة الأميركية في بيروت. ومع ذلك، فإنّ مشاركتك ستساعدنا في وضع الأساس لمزيد من الدراسات والإستراتيجيات حول تغذية الرُضّع والأطفال في لبنان التي لها تأثير كبير على بقاء الطفل على قيد الحياة، ونموّه وصحّته في المستقبل.

دراسات مستقبلية ومتابعة

هناك احتمال أنّ المعلومات التي نحصل عليها من خلال هذه الدراسة قد تخلق الحاجة إلى دراسات متابعة لها دور مهمّ في تحديد نتائج متعلّقة بتغذية الرضيع والطفل في مرحلة مبكرة من عمره وبنشأته في وقت لاحق. هناك أدلة تشير إلى أن أوّل 1000 يوم من حياة الطفل يمكن أن تحدّد مسبقاً مدى بقاءه على قيد الحياة ونموّه ونشأته وتطوّر الأمراض المزمنة في مرحلة البلوغ، ممّا يعزّز دور كلّ من النظام الغذائي وأنماط التغذية. نحن نسعى لموافقتك علىّ الاتصال بك فقط في حال تمّ إنشاء هذه الدراسات المتابعة. لست ملزمة بالمشاركة

في الدراسات إذا وافقتِ على أن نتصل بك. وإذا كنتِ ترفضين أن نتصل بك، فإنّ هذا لن يؤثر على مشاركتك في هذه الدراسة. سوف يتم الاحتفاظ بالمعلومات الخاصة بك بسريّة. فقط الباحثون الرئيسيون والمساعدون في هذا البحث سوف يتمكنون من الحصول على المعلومات الخاصة بك والتي ستوجد في خزانة مغلقة في مكتب الباحث الرئيسي.

هل يمكننا الاتصال بك مرة أخرى في حال تمّ إنشاء المزيد من الدراسات المتابعة (يرجى وضع دائرة)؟

نعم كلا

إذا كانت الإجابة نعم، يرجى تزويدنا برقم الهاتف الخاص بك _____

لمزيد من المعلومات والأسئلة حول البحث، يُرجى الإتصال بالأشخاص المذكورين أدناه:

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إذا كانت لديك أي أسئلة، مخاوف أو شكوك حول حقوقك كمشاركة في هذا البحث، يمكنك الإتصال بالمكتب التالي في الجامعة الأميركية في بيروت:

مجلس مراجعة مؤسسي العلوم الإجتماعية والسلوكية

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موافقة المشاركة:

لقد قرأتُ وفهمتُ المعلومات الواردة أعلاه.

أوافق طوعاً على المشاركة في هذه الدراسة البحثية وأسمح لكم بالحصول على القياسات الخاصة بطفلي

اسم المشاركة: _____ التاريخ: _____

توقيع المشاركة: _____

الشهادة على الموافقة (في حال كانت المشاركة أمية):

أشهد على أنّ المقابل قرأ النصّ الوارد أعلاه للمشاركة، وها أنا أوقع نيابة عن المشتركة التي وافقت طوعاً على المشاركة في الدراسة.

اسم الشاهد: _____ التاريخ: _____

توقيع الشاهد: _____

علاقة الشاهد بالمشاركة: _____

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