

Maternal Perception of Body Mass Index and Dietary Habits Leading to Obesity Among Saudi School Aged Children a Comparative Study

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To cite this article:

Maha Mohammad Al Balawi, Manal Fehade Al-Harbi, Sahar Mohammed Hassan Yakout. Maternal Perception of Body Mass Index and Dietary Habits Leading to Obesity Among Saudi School Aged Children a Comparative Study. *World Journal of Public Health*. Vol. 3, No. 1, 2018, pp. 23-31. doi: 10.11648/j.wjph.20180301.14

Received: March 31, 2018; Accepted: April 15, 2018; Published: May 17, 2018

Abstract: *Background:* Childhood obesity is one of the most severe public health problems of the 21st century. Obesity is global, and it affects many low- and middle-income countries, especially in urban settings; its prevalence has increased at an alarming rate. The study was carried out in Prince Sultan Military Medical City and King Fahad Medical City in Riyadh, as well as the North West Armed Forces Hospital in Tabuk. *Method:* A quantitative correlative cross-sectional design was used. A non-probability sampling of mothers of school-age children (n=300) was recruited. The questionnaire developed with two parts: tool I was a structured questionnaire, while tool II was the Child Feeding Questionnaire (CFQ). *Result:* The mean age of the mothers in Riyadh was 38.81±6.06 years old, while in Tabuk it was 40.3±5.8 years old. Regarding maternal perception about their children, BMI (80.7%, 82%) did not know the importance and detection of BMI and 80.7% not assessed before their BMI. There was a significant correlation between mothers' BMIs and their children's BMI. In comparison between maternal perception and actual BMI in Tabuk, 16.6% of mothers perceived their children to be underweight, but 4.8% of were underweight. *Conclusion:* It was concluded that over half of mother had fair to poor scores concerning knowledge about children's eating habits. Moreover, one-third of maternal perception and practices about the CFQ ranged from fair to poor. Thus, the researcher recommended applied nutritional counselling, and education should be provided; furthermore, children should be involved in group and diet workshops.

Keywords: Maternal Perception, Body Mass Index (BMI), Child Feeding Questionnaire (CFQ), Total Dietary Habits (TDH), Obesity, School-Aged Children

1. Introduction

The worldwide prevalence of overweight and obesity in children has increased at an alarming rate throughout the world. Obesity affects all levels of society, and thus it's described as a global epidemic. The highest rates of childhood obesity have been observed in developed countries, but its prevalence is also increasing in developing countries. The prevalence of childhood obesity is high in the Middle East. In Saudi Arabia, between 2000 and 2012, the rates of overweight and obesity among school-aged children

increased by 23% and 9.3%, respectively; one in every six children aged 6–18 years old is obese [1-3]. Although the national prevalence of overweight and obesity has been reported in adults and more recently in children information on regional differences in the Kingdom of Saudi Arabia (KSA) is scanty. The well-known regional variation in growth between regions in the KSA suggests diversity in the prevalence of nutritional disorders, including overweight and obesity [4-6].

Obesity represents a major health crisis that is affecting a large portion of society. It is considered to be a public health concern in both developed and developing countries. Since

1980, the United States has experienced this problem in children and adolescents, with increases of obesity of 200% and 300% respectively [7, 8]. According to the CDC, 17% of children suffer from overweight and obesity in the United States and surveys have revealed that nearly one out of every five US children is overweight; moreover, this number is increasing rapidly [8]. Approximately 10% of the world's school-aged children are estimated to be overweight or obese. In the United States, according to the National Health and Nutrition Examination, 18% of children were obese or overweight in 2009 and 2010. Also about 30% of school-aged children in the United States misperceive their weight status; this is more common in boys (32.3%) than in girls (28%). Another survey in the United States showed that 34.2% of school-aged children are obese (BMI \geq 85th percentile), 17.7% are obese (BMI \geq 95th percentile), and 6.8% are severely obese (BMI \geq 120 percentage of the 95th percentile or \geq 35 kg/m²) [9-11]. In the Kingdom of Saudi Arabia, overweight and obesity are the most common non-communicable diseases found in the primary care setting. In 2010, data from a national sample of Saudi children showed that the prevalence of overweight and obesity in school-aged children (6 to 12 years) was 19.9% in boys and 19.2% in girls adulthood [12, 13]. In 2012, the National Health and Nutrition Examination Survey (NHANES) on childhood overweight and obesity among school-aged children showed that the prevalence of overweight was 34.2% and that of obesity was 17.7% [14-17]. Because childhood obesity often persists until adulthood, an increasing number of adults will be at an increased risk of these conditions, as well as of cardiovascular disease, osteoarthritis, and certain types of cancer [18-20]. Furthermore, eating habits have also changed, and current habits include low consumption of fruits, green vegetables, and milk; increasing consumption of snacks, sweets, and soft drinks; and skipping breakfast. These eating habits result in a continuous increase in adiposity among children [21]. In the case of children, mothers have been universally accepted to be primarily responsible for food Purchases, choices, and food preparation. An underlying problem with this approach is the dependence on maternal perception, and thus a parent must first be able to recognize when a child's diet is poor, and know how to make the necessary changes [22, 23]. The lack of awareness and thus misperception for various health-related problems such as mothers not recognizing obesity in their children [24-26]. The way in which a mother perceives their child's diet quality is significant in ensuring a healthy diet for optimal development and disease prevention. Maternal feeding practices have an important role in the development of overweight and eating behaviors in school-aged children; thus, they represent potential targets for effective prevention interventions to decrease child obesity [27, 28, 29].

Body mass index (BMI) is a tool used to measure obesity that has been adopted by the International Obesity Task Force. BMI is a reliable indicator of body fatness for most children and teens [30]. BMI can be considered an alternative

to direct measures of body fat. In addition, it is an inexpensive and easy-to-perform method of screening for weight categories that may lead to health problems [31]. When BMI is calculated for children and teens, the number is plotted on the Centers for Disease Control and Prevention (CDC) BMI-for-age growth charts (for either girls or boys) to obtain a percentile ranking, percentiles are the most commonly used indicator to assess the size and growth patterns of individual children in the United States [32, 33]. The maternity nurse, as a member of the healthcare team, has a unique role in raising awareness. She is responsible for helping Saudi mothers and their children to understand the problem of obesity and the dangerous consequences for physical, social, and psychological health with a view to changing their lifestyles. Although obesity is increasing in Saudi Arabia, previous studies have reported a high prevalence in some areas of the KSA but not all of them. In Saudi, with limited research that assessed mothers' perceptions regarding BMI and dietary habits, it is mandatory to investigate particular areas, such as the city of Tabuk in the northern region of Saudi Arabia to inform the community about the problem and highlight the mothers' role in mitigating it.

Aim of the Study

The aim of this study is to assess the maternal perceptions of BMI and dietary habits for their school-aged children as indicators in obesity screening in Tabuk and Riyadh. This aim will be attained through the following objectives:

1. Understand maternal perception for BMI and dietary habits leading to obesity among school-aged children.
2. Investigate maternal assessment of school-aged children's BMI and dietary habits.
3. Compare of the perceptions of mothers in Tabuk and Riyadh concerning BMI and dietary habits as indicators in obesity screening.

2. Methods

2.1. Study Design and Setting

A quantitative comparative, exploratory, correlative cross-sectional design was used to conduct this study. The research was conducted at the general outpatient pediatric clinics in three hospitals which are Northwest Armed Forces Hospital in Tabuk, Prince Sultan Military Medical City (PSMMC) in Riyadh and King Fahad Medical City (KFMC) in Riyadh.

2.2. Participants

The data was collected from April to July 2017 with a purposive sampling. The sample included mothers who attend the pediatric clinics at the North West Armed Forces Hospital, SMMC, and KFMC. The participants of this study comprised 150 mothers of school-age children selected from Tabuk and 150 mothers of school-age children chosen from Riyadh. The sample size was calculated using the following equation:

$$Z^2 \times p \times q / d^2$$

Regarding the Maternal perception of body mass index and dietary habits leading to obesity among Saudi school children (p) was unknown, it was estimated to be $50\% = 0.5$, $q = 1 - p = 0.5$, and the value of 0.04 was chosen as an acceptable limit of precision (d). At a 95% confidence limit, the calculated size of the sample was 400 participants. This number was reduced, as the number of participants reached 300 during the fieldwork. The eligibility criteria was educated Saudi mothers who had school-aged children (6–12 years) and available on the day of the interviews.

2.3. Data Sources/Measurement

The questionnaire developed with two parts. Part one was structured interview questionnaire sheet which developed by the researchers based on the literature review [39, 40] to collect data about mothers and their children, it consists of three parts: Part I covered the mother's data, such as age, level of education, and family income. Part II covered the child's demographic data, such as gender, age, education year, and birth order. Part III considered maternal perception about eating the healthy diet for their children, food style, eating habits, children's eating habits before going to school, the role of food in obesity and measurement of BMI.

Part two was as the following: 1) The Child Feeding Questionnaire (CFQ) was adopted from Birch et al. (2001) [6] to assess maternal perceptions and concerns regarding child obesity which consists of seven items; 2) Perceived responsibility (PR): This measure is a three-item subscale assessing mothers' perceptions of their responsibility for child feeding. The scale has response ratings of 1 (low feelings of responsibility) to 5 (high feelings of responsibility); 3) Perceived parent weight: is a measure of four-item subscale that considers parents' perceptions of their weight status history. The scores range from 1 (markedly underweight) to 5 (markedly overweight); 4) Perceived child weight: This six-item subscale measures parents' perceptions of their child's weight status history. The scores range from 1 (markedly underweight) to 5 (markedly overweight). The sixth item (parents' perception of their child's weight from 6th through 12th grade) was applied to mothers with children in these grades; 5) Parents' concerns about child weight: This is a three-item subscale that assesses parents' concerns about the child's risk of being overweight. Scores range from 1 (unconcerned) to 5 (highly concerned); 6) Restriction: This is an 8-item subscale that assesses the extent to which parents restrict their child's access to palatable foods. This measure considers the restriction of both the type and amount of food. Scores range from 1 (low restriction) to 5 (high restriction). 7) Pressure to eat: This is a four-item subscale that measures parents' tendency to pressure their children to eat by following certain behaviors, such as insisting that the child finish the food on his/her plate. Scores range from 1 (low) to 5 (high) levels of pressure. 8) Monitoring: This is a three-item subscale that assesses the extent to which parents oversee their child's consumption of sweets, snack foods, and

high-fat foods. Scores range from 1 (never) to 5 (always). The questionnaire forward translation was done by the study researchers then it was back-translated by two Arabic-English translators. Content validity of the structured questionnaire sheet was reviewed by five childhood obesity specialists who reviewed the questionnaire in English to ensure consistency and relevancy. Cronbach's alpha is a measure of internal consistency, it was determined to be 0.78 for the pilot trial. It was carried out on 10% of the total study sample to test the face validity and reliability of the tools. The tools were modified according to the results. The participants who were involved in the pilot study were excluded from the study sample. At the beginning of the interview, the purpose of the research was discussed with each attendee separately and, upon acceptance verbal and written consent were obtained. The participants were informed of their ability to terminate the interview at any point. No participants requested to stop the interview, the questionnaire for interviewing the participants was anonymous and confidential and had been pre-constructed for the study.

2.4. Data Analysis

Data were coded for entry and analysis using SPSS statistical software package version 20. Data were presented using descriptive statistics in the form of frequencies and percentages. Interval and ratio variables were shown in the form of means and standard deviations. Chi-square was used for nominal and ordinal data. The Pearson coefficient was used to test correlation. The significance level was set at $p < 0.05$.

3. Results

The study descriptive data was presented in Table 1. Table 2 described mother's knowledge about eating their children healthy diet while Table 3 described maternal perception about their children's eating Habits.

Table 1. Socio-demographic Characteristics of the mothers and their children in Riyadh and Tabuk (N=300).

Variables	Riyadh (N=150)		Tabuk (N=150)	
	No	%	No	%
Mothers				
Age				
20 – 30	13	8.5	12	8.2
31 – 40	86	56.2	77	52.4
41 – 50	49	32.0	55	37.4
More than 50	5	3.3	3	2.0
Mean \pm SD	38.6 \pm 6.1		40.3 \pm 5.87	
Education				
Illiterate	0	0	0	0
Read and write	2	1.3	3	2.0
Elementary school	3	2.0	7	4.8
Middle school	53	34.6	57	38.8
High School	15	9.8	22	15.0
University	75	49.0	54	36.7
Graduate	5	3.3	4	2.7
Income				
Less than 4000	2	1.3	1	0.7

Variables	Riyadh (N=150)		Tabuk (N=150)	
	No	%	No	%
4000 – 7000	20	13.1	24	16.3
7000 - 1000	131	85.6	122	83.0
Mother occupation				
Teacher	50	32.6	29	19.7
Medical	20	13	6	4
Housewife	73	47.7	56	38
Other	10	6.5	56	38
Children Age				
5-6	22	14.4	27	18.4
7-8	39	25.5	29	19.7
9 -10	50	32.7	52	35.4
11-12	42	27.5	39	26.5
Gender				
Male	66	43.1	62	42.2
Female	87	56.9	85	57.8
Education				
First	22	14.4	28	19.0
Second	38	24.8	23	15.6
Third	6	3.9	9	6.1
Fourth	18	11.8	17	11.6
Fifth	31	20.3	36	24.5
Sixth	38	24.8	34	23.1

Table 2. Mother's Knowledge about eating, their children healthy Diet in Riyadh and Tabuk (N=300).

Variables	Riyadh (N=150)		Tabuk (N=150)		P
	No	%	No	%	
Eat more vegetables					
Never	2	1.3	0	0.0	0.491
Rarely	2	4.6	9	6.1	
Sometimes	32	20.9	28	19.0	
Usually	112	73.2	110	74.8	
Eat more Fruit					
Never					0.329
Rarely	12	7.8	16	10.9	
Sometimes	10	6.5	14	9.5	
Usually	24	15.7	29	19.7	
Eat Protein	107	69.9	88	59.9	0.358
Never	1	0.7	2	1.4	
Rarely	8	5.2	13	8.8	
Sometimes	19	12.4	24	16.3	
Usually	125	81.7	108	73.5	0.467
Drink milk and Juice					
Never	1	0.7	1	0.7	
Rarely	4	2.6	8	5.4	
Sometimes	12	7.8	16	10.9	
Usually	136	88.9	122	83.0	

* Rating scale: (1 = never, 2= rarely, 3= sometimes, 4 = usually). The higher score, the more reliable.

Table 3. Maternal perception about their Children's Eating Habits (N=300).

Variables	No	%
Number of meals per day		
1	0	0
2	1	.3
3	299	99.7
Number of Snakes per day		
1	22	7.3
2	234	78
3	44	14.7
Number of breakfasts per week		
Everyday	229	76.3

Variables	No	%
4 times	15	5.0
3 times	39	13.0
Less than 3 times	17	5.7
Breakfast time		
Before 7 am	81	27.0
7 – 8 am	177	59.0
8 – 9 am	34	11.3
After 9 m	8	2.7
Lunch time		
12 – 1 pm	35	11.7
1 – 2 pm	85	28.3
2 – 3 pm	125	41.7
After 3 pm	55	18.3
Dinner time		
Before bed time	215	71.7
At 7 pm	85	28.3
Child Meals per day		
Breakfast	283	94.3
Snack after breakfast	92	30.7
Lunch	194	64.7
Snack after lunch	221	73.7
Dinner	156	52.0
Snack after dinner	161	53.7

* More than one answer

For the mother's knowledge about their children food style, more than half of mothers (57.3) add seasoning to their child food, while more than one-third of mothers didn't add seasoning to the food. More than half of children (51.3%) had 3 cups of water daily, while only (4%) of them had 1-2 cups daily. It was observed that more than two-thirds (67%) of mothers had sometimes tried new foods with their child, while more than one-quarter (27%) of them answered yes, and only (6%) of them answered no. The majority (83.3%) of mothers had allowed their children to pick up their food, while (16.7%) of mothers they did not allowed. The result of children eat fast food was more than two-thirds (66.3%), while more than one-third (33.7%) they did not eat fast food. More than two-thirds (66.7%) of children used to eat while watching TV, while more than one-third (33.3%) of children did not watch. The maternal perception about food eaten by their children and lead to obesity, about two third (62%) of mothers they did not know about which food dose their child eat and leads to obesity. While more than one-thirds (38%) of mothers they know. Common type of food that lead to obesity was intake of juice (15.7%), ice cream (30.3%), and chips (24%). Healthy food chosen by mothers were minority, meet, fish, and chicken (1.3%), fresh vegetables (1%), and cocked vegetables (1.3%). The maternal perception about their Children's BMI, most (97.7%), (95%) of mothers their child weight and height assessed before, considerable high percentage of mothers (80.7%) did not know the importance of measuring height and weight for their children. Regarding BMI 19.3% BMI of their children assessed before and majority (80.7%) not assessed. Only (18%) know the definition of BMI and majority (82%) gave wrong answer or did not know. The majority (87%) of mothers did not know their children BMI and more than one-fifth (13%) known. As regards self-perception of their child BMI, it was noticed that, (14.7%) perceived their children as underweight, (45%)

perceived normal weight, (29%) perceived their children overweight and (11.3%) perceived as obesity. Also, about one third (31%) of the sample indicated that they are responsible for feeding of their children most of the time, while only (9%) of them were never responsible for the feeding. Concerning perceived parent weight, it was notified that, about three-quarters (76%), (62.7%), (58%) of the sample subjects indicated that the parent weight was normal during childhood, adolescent and at present respectively. while only of (0.3%, 2.7%, 0.3%) of perceived their weight markedly overweight. Maternal beliefs, attitudes and practices, regarding their school child feeding with focus on obesity proneness in children were analyzed by using seven-factor model of CFQ. Two-thirds (64.3%, 66.7%, 69%) of mothers monitoring their child eat for example sweets, snacks food, and high fat food respectively, while a minority never monitor (2%, 0.7%, 0.1%) respectively. (34.7%, 34.5%) of subjects reported that, they were responsible for deciding child's portion sizes and right kind of food respectively, while minority (1%, and 1.3%) never responsible about that. It was observed that, (66.3%, 24.3%, 20.7%) perceived their child weight as normal in 2nd grade, 5th grade, and 6th grade respectively, while (10.3%, 9%, 7.3%) perceived them underweight in 2nd, 5th, and 6th grade respectively. Data showed also, about one-half (41.3%, 47.7%, 52.3%) of subjects very concerned about child if eating too much, having diet to maintain a desirable weight, overweighted respectively. While a minority (1.7%, 0.3%, 1%) were unconcerned respectively. Regarding restriction, data showed that (77.7%, 82.7%, 63.7%) of the study subjects restrict their children to eat many food, sweets, high fat food, and his/her favorite food respectively. Also, (48.7%, 59.3%, 41.7%) of them keep some foods out of child's reach. About two-thirds (35%, 31%) of mothers disagree to offer some sweets and foods as a reward for good behavior respectively, while (11%) and (17.3%) agree respectively. (59.3%, 41.7%) of the mothers agree, that they were not guide or regulate child's eating. More than half (58.7%) of mothers made pressure to their child to eat enough and more than two-thirds (36.7%) of them made pressure to eat all of her/his plate. About one-half (43.3%) not made pressure on their children, but she wants their children to eat much less than he/she should. While (26%) made pressure if their children not hungry, try to get them to eat any way. There was a statistically significant positive correlation between factor total Score of seven-factor model of Child feeding Questionnaire and education ($p = 0.010$). There was a statistically significant positive correlation between actor Total Score of seven-factor model of Child feeding Questionnaire and income ($p = 0.000$). This is indicated that the more educated mother, the better score of child feeding questionnaire. For estimated factor correlation for the seven-factors model of child feeding questionnaire, the highest correlation between factors were between restriction and monitoring scales. Higher level of restriction was associated with greater monitoring. In addition, the pressure to eat scale was significant negatively associated with perceived child

weight, indicating that parents who perceived their child as being thinner reported using higher level pressure to eat with child were P value = (0.00), $r = (-.0357)$. There was a statistically significant positive correlation between factor perceived responsibility and perceived parent weight and child weight, concern about child weight restriction and monitoring. Concern about child weight was statistically significant with restriction and monitoring. there was statistically significant relationship between Total Score Dietary Habits Questionnaire and Children's BMI ($p = 0.00$). (65.4%) of mothers CFQ were fair of their children had normal weight. While 29.9%, 4.7% overweight and obese respectively. Good total score of 46% had normal weight, while 51.8% overweight and obese respectively. There was statistical significant difference, were P value = 0.00. Comparison between maternal perception and actual BMI in Riyadh and Tabuk is in Table 4.

Table 4. Comparison between maternal perception and actual BMI in Riyadh and Tabuk (N=300).

Children BMI	Tabuk		Riyadh		Tabuk		Riyadh		P
	No	%	No	%	No	%	No	%	
Under weight	26	16.6	19	12.6	7	4.8	10	6.5	0.127
Normal Weight	69	46	66	44	82	55.8	84	54.9	
Over weight	43	28.6	44	29.3	44	29.9	52	34	
Obese	15	10	19	12.6	14	9.5	7	4.6	

4. Discussion

The prevalence of childhood obesity has increased over the past three decades due to poor eating habits and eating high amounts of high-calorie foods, leading to childhood obesity. Prevention of childhood obesity is the best way to decrease the risk of physical morbidities and psychological problems. Parents are crucial in controlling the child's environment and implementing effective prevention strategies. Obese children face many physical, medical, and metabolic complications, such as diabetes mellitus, hypertension, dyslipidemia, non-alcoholic fatty liver disease, and orthopedic disorders [34]. The leading cause of obesity is not fully understood, but previous researchers have confirmed that obesity occurs when the energy intake exceeds the energy expenditure [35]. The mean age of the mothers in Riyadh was 38.81 ± 6.06 years, while in Tabuk, it was 40.3 ± 5.8 years which is approximate to the results of Pakpour et al. (2011), [14] who reported that the mean ages of mothers for the control and intervention groups were 33.2 ± 6.4 and 34.1 ± 3.8 years, respectively. Regarding the mothers' education, 49% of subjects had completed their university education in Riyadh, while 38.8% had completed only their middle school education in Tabuk. This study could not discern a significant association between childhood obesity and maternal occupational or educational level; this result is dissimilar to that of Warschburger and Kröller (2012), [36] who reported that mother education and occupation, as well as family income, have significant effects on mothers' accuracy in

identifying obesity.

About 47.7% and 38% of mothers in this study were housewives, and 32.6% and 19.7% were teachers in Riyadh and Tabuk, respectively. This finding is by Vázquez (2013), [37] who stated that living in a non-intact family environment, low maternal educational level, and having a mother who works outside of the home encourages the development of risk behaviors for health in children, such as obesity. The mother's level of knowledge affects the association between obesity and eating habits, and children who have good dietary habits are known to be healthier. Many factors are suspected to influence maternal food choice; mothers with good dietary knowledge are more likely to teach their children about healthy food choices. The results of the present study show that about three-quarters (73.2%, 74.8%, respectively) of mothers usually encouraged their children to eat more vegetables in Riyadh and Tabuk. There was no significant difference between the two cities. Meanwhile, about two-thirds (69.9%, 59.9%, respectively) usually encouraged their children to eat fruits in Riyadh and Tabuk; these results are by those of Yabancı, Nurcan, and Suzan (2014), [38] whose study included 302 mothers of students. Their results indicated that 64.7% of mothers always made their children eat at least three portions of vegetables a day, while 62.4% always encouraged their children to eat more fruits.

Many of the mothers with more knowledge about the eating habits of their children had normal weight. Also, the mothers with higher knowledge provided their children with a healthier diet (e.g., vegetables, fruit, juices, and fewer soft drinks and fast foods) than the mothers with lower knowledge about nutrition. This result could be explained in that mothers who were more educated had more knowledge about eating habits. Perceived mother modeling, perceived mother support, and perceived fruit and vegetable availability were significant predictors of fruit and vegetable consumption. The relationship between perceived mother support and fruit and vegetable consumption was mediated by self-efficacy [39]. In this study, breakfast was considered "the most important meal of the day." It was found that 76.3% had breakfast every day, while only 13% had breakfast three times per week exactly. This is similar to the results of Tylor (2007), [40] who reported that only (30%) of children ate breakfast before leaving home. When a child consumes sufficient food at the beginning of the day, this helps the body to obtain the nutrients it needs. The data showed that more than half of the children (51.3%) consumed three cups of water daily, while 4% had two cups daily. This result is by Drewnowski and Rhem (2013), [41] who reported that water consumption among American children was 49.6%, which is lacking. It is dangerous because water represents a critical nutrient whose absence will be lethal within days. The data also showed that nearly two-thirds (66.3%) of children ate fast food, while more than one-third (33.7%) did not eat fast food. This result agrees with that of Denney and Okely (2008), [42] who stated that the prevalence of consumption of fast food was higher

among boys than girls. The fast-food consumption rate for boys was 19.6% in grade 6, 15.7% in grade 8, and 16.0% in grade 10. Among girls, grade 10 students were most likely to report eating fast food at least once per week (14.0%), while 9.2% of grade 8 and 10.2% of grade 6 girls consumed fast food. About children's eating habits before going to school, it was observed that more than one-third of children had taken breakfast before going to school, while more than one-half did not take breakfast before going to school. This may be due to the time of intake of breakfast or choice of food by school children, to identify reasons behind usual breakfast practices and explore the attitude of mothers about breakfast. This is in agreement with Senanayake *et al.* (2009), [43] whose study result showed only 30% ate breakfast and 70% left home without breakfast. Regarding the maternal perception of their children's weight and their actual BMI, it was found that 72% and 73.7% of mothers in Tabouk and Riyadh, respectively, perceived their children to be underweight when their BMI was normal. These findings agree with those of Rietmeijer and Paluis (2012), [44] who reported that 47.7% of their children were incorrectly perceived as having normal weight by their parents. This can be explained by Saudi women's fear of the evil eye, which causes them to see their children as underweight when they are in fact normal. The study results showed significant a statistically significant relationship between children's BMIs and their mother's BMIs. Obese and overweight children had parents who were heavier than normal. Another study indicated that mothers' BMIs are strong predictors of children's BMIs. [44, 45]

In the present study, about more than two-thirds (67.5%) of the children had practiced exercise and had normal weight. About one-third (33.3%) of children did not engage in physical exercise, and they were obese. This could be explained in that exercise will increase energy requirements and decrease fat deposits. Hilbert *et al.* (2007), [46] reported that lack of physical exercise was one of the main causes of obesity. AL-Rukban (2003), [47] studied a group of subjects age 12–20 years from Saudi Arabia to assess the relationship between obesity and sociodemographic data and physical activities, and he reported that family history and lack of physical activity were associated with adolescent obesity.

The present study showed there was a statistically significant positive correlation between child age, child weight, and birth order ($p=0.00$). The first and last children within the families were more likely to be obese than the children born in between. These findings agreed with Lafta and Kadhimi, 2005, [48] They reported significant associations between overweight, age, and number and order of the children. Teaching healthy behaviors at school age is important since change becomes more difficult with aging. Behaviors involving physical activity and nutrition are the cornerstone of obesity prevention in children and youth. Families and schools are the two most critical links in providing the foundation for those behaviors.

According to Keller *et al.* (2006), [49] older mothers were more likely to perceive their children as being more

substantial than younger mothers. Older mothers were also more likely to monitor children's fat intake in siblings than more adolescent mothers. This finding conflicts with the present research results, which showed no statistically significant positive correlation between the total score of the seven-factor model of the CFQ and mother age ($p=0.383$).

Regarding the maternal perception about factors related to children's obesity, Moore (2009), [50] reported that the majority of mothers exhibited poor eating behavior (96.6%). The lack of parental control (86.2%), eating too much (81%), hormonal problems (33.3%), and peer pressure (23.3%), which were considered the most significant causes of childhood obesity. The present study revealed that most mothers (91%) perceived that increased food intake leads to obesity, while more than one-third (35%) perceived that obesity is caused by peer pressure. Also, about three-quarters (73.7%, 71.7%, and 71.7%) of mothers perceived that unhealthy diet, sedentary lifestyle, and food caused child obesity.

Webber et al. (2010) [51] reported that higher child weight was associated with higher "pressure to eat" and lower "restriction" factors. Restriction increased as maternal awareness about overweight increased, and maternal concern about overweight was associated with childhood obesity and restriction. Use of pressure increased when the mothers perceived their children to be thinner, but the perceived weight was not associated with child weight status and maternal pressure to eat.

Monitoring was not associated with childhood obesity or maternal perception of weight. This study supported my findings on maternal beliefs, attitudes and practices regarding their school child are eating with a focus on obesity proneness. The data showed that about one-half (41.3%, 47.7%, 52.3%) of mothers were very concerned about whether their children were overeating or were overweight. Meanwhile, a few mothers (1.7%, 0.3%, 1%) were unconcerned about these issues. Obesity was the most common diet-related health disorder among the parents of the subjects, followed by diabetes mellitus.

The data showed that if both parents were obese, 70% of the subjects were also obese. This could be explained in that obesity aggregates within families because of shared genes and environments. Children may have had the same dietary habits and lifestyles as their parents, such as eating high-calorie foods and neglecting exercise. [46]

Regarding maternal dietary restriction, data showed that 77.7%, 82.7%, and 63.7% of the study subjects restricted their children's intake of sweets, high-fat foods, and their favorite foods, respectively. Also, 48.7%, 59.3%, and 41.7% of them kept some foods out of their children's reach. About two-thirds, 35% and 31% of mothers disagreed with offering sweets and other foods as a reward for good behavior, respectively, while 11% and 17.3% agreed with this practice. Furthermore, 59.3% and 41.7% of the mothers agreed that they did not guide or regulate their children's eating. More than half (58.7%) of mothers pressured their children to eat enough, and more than two-thirds (36.7%) of them pressured

their children to clean their plates. Thus, the results of the research study revealed that more than one-third of mothers had fair to poor dietary habits, and more than one-third their practices, attitudes, and beliefs about child feeding. This is because mothers' imposition of control in feeding is prompted by perception and concerns regarding the child's risk of obesity. Maternal restriction and pressure to eat affect self-confidence related to eating in the child. The implication for pediatric nurse: as the pediatric nurse has a unique role in the health care delivery system and the role as facilitators to deliver health to the public. Thus, they can educate mother and increase awareness about the causes and consequences of childhood obesity.

5. Conclusion

Based on the findings of the present study, it is concluded that more than one-half of mothers' total scores on knowledge about children's eating habits ranged from fair to poor. Furthermore, more than one-third of maternal practices, attitudes, and beliefs as assessed by the CFQ ranged between fair and poor. A high proportion of mothers did not know about which foods their children eat that lead to obesity. Also, there was significant discrepancies between children's actual weight status and perceptions among mother of children's weight, particularly for obesity/overweight. This tendency needs more attention as, school-aged children tend to have a higher prevalence of obesity-related conditions, particularly CVD, at a younger age. There was a tendency among less-educated mothers to perceive their children's overweight/obesity status. A higher percentage of mothers with higher education were able to recognize their children's overweight or obesity than mothers with less education.

Recommendations

1. Nutrition and physical education programs for school-aged children should focus on mother role modeling in promoting a healthy lifestyle and good dietary habits.
2. Educational school health programs should be implemented to affect the lives of school-aged children by improving health-related knowledge, attitudes, and the skills needed to learn healthy behaviors and good health outcomes.
3. Strategies should be implemented to achieve positive health outcomes for Saudi school-aged children by promoting regular physical activity. It is a fundamental public health strategy that has been identified to have notable effects on health improvement at the individual and societal levels.
4. Free drinking water should be made available to all students, and the sale of drinks with added sugars, like sodas and juices, should be limited in schools;
5. Interventions should focus only on modifiable behaviors (e.g., physical activity, limited intake of sugar-sweetened beverages, teasing, time spent watching television).

6. Mothers should be provided with information to feed their children, especially when they are concerned about their children's weight. Workshops may also be necessary in some cases. Heighten mother's perception; mothers should be educated to monitor school-aged children's BMI for age; in this way, issues can be identified in a timely fashion. Using sketches will help to determine overweight children; and
7. Further comprehensive research should be undertaken to study the lifestyles of families of obese children and how to prevent obesity.

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