Epidemiology of Childhood Obesity and Their Lifestyle in Preschool Children from Medan Deli

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Abstract: Obesity in children is a serious problem because it can interfere with children's growth and continue into adulthood. This study aims to determine the epidemiology of obesity and how the lifestyle in early childhood in Medan Deli. This research is a descriptive quantitative study using a cross-sectional design with a rapid survey approach. The population in this study were all early childhood children in Medan Deli, with a sample of 210 people. The sampling method was the WHO proportional random sampling, which was 30 clusters x 7 samples. The results found 13.8% obese early childhood and 13.3% overweight children. The most obese early childhood children were girls, aged 56-60 months, with a history of obese parents. In the lifestyle of obese early childhood, they rarely do physical activity, often consume milk, fruit, vegetables, soft drinks, and junk food and live with smokers and often inhale cigarette smoke. The incidence of obesity in early childhood in the study area is high with a very vulnerable lifestyle to their health in the future, such as rarely doing physical activity, often consuming milk, soft drinks and junk food, and being exposed to cigarette smoke.

1   INTRODUCTION

Overweight and obesity are defined as abnormal or excessive fat accumulation that can be detrimental to health. It is a major risk factor for chronic diseases, including diabetes, cardiovascular disease and cancer. Furthermore, considered a problem in high-income countries, overweight and obesity are also increasing in low- and middle-income countries (WHO, 2021b).

WHO states that in 2016 more than 124 million children in the world were obese. Obesity in children in the world has increased from 4.2% in 1990 to 6.7% in 2010 and is expected to reach 9.1% in 2020. In 2010, obesity in children under five years in developing countries reached 5.4% and increased in 2012 to 6.7% (WHO, 2021c).

Based on Riskesdas 2018 data, the prevalence of obesity in children in Indonesia is 8.04%, and Riskesdas 2013 data shows that the prevalence of overweight and obesity in children in North Sumatra is 10.5%. The prevalence of obesity in children in Medan City has increased from 1.7% in 2016 to 1.9% in 2017, with the highest prevalence in Medan Deli

District, which is 21% (Dinkes Kota Medan, 2016, 2018; Kemenkes RI, 2013, 2018)

Obesity in children occurs in three critical period that are the first year of life, ages 5-6 years, and adolescence. Along with the times, there is a change in lifestyle among the community, especially children. This change is a contributing factor to obesity. According to Pavilianingtyas (2017) research, the risk of obesity in children can be influenced by three factors, namely the agent, the host, and the environment. Agent factors include fast food consumption habits and light physical activity, host factors including genetics, and environmental factors, including household income and expenditure levels and mother's education level (Pavilianingtyas, 2017).

Obesity in children is a very serious problem because it can interfere child development then continue into adulthood and can be risk factors for diseases such as hypertension, type 2 diabetes, hyperlipidaemia, NAFLD, polycystic ovary syndrome, sleep disorders, and depression. For that, detection of obesity needs to be done early on (Benzies et al., 2018).

Early childhood, in general, can be found in Early Childhood Education (PAUD). The types of PAUD

in Indonesia are playgroups (KB), kindergartens (TK) and raudhatul athfal (RA). The range of early childhood according to Article 28 of the National Education System Law No.20/2003 paragraph 1 is 0-6 years. Meanwhile, according to the NAEYC (National Association For The Education Of Young Children), the range of early childhood is 0-8 years (golden age) (Depdiknas, 2003).

Many studies on obesity in adults and adolescents have been carried out, especially in Medan, North Sumatra. However, studies related to obesity in early childhood (0-6 years) are still few. Based on some of the considerations above, researchers are interested in analyzing obesity in early childhood. Therefore, this study aimed to describe the incidence of obesity in early childhood in Medan Deli District in 2019.

2 METHOD

2.1 Type of Research

This research is descriptive quantitative research using the Epidemiological rapid survey method, conducted in November 2019.
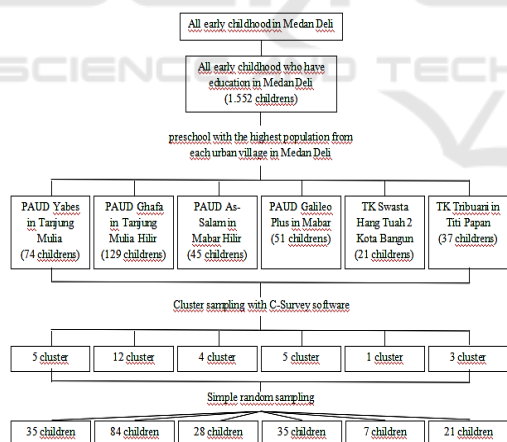
2.2 Population and Research Sample

Figure 1. Sampling Profile's Chart

The population in this study is all early childhood in the District of Medan Deli. The sample used is 210 people with the calculation of using the WHO Rapid Survey approach, which is 30 clusters x 7 samples with the help of C-Survey software. Sampling shows in the figure above.

2.3 Data Collection

Data was collected primarily with a research instrument in the form of a questionnaire containing questions about demographic characteristics, physical activity, diet and exposure to cigarettes. Determination of obese and non-obese respondents was carried out using a Z-Score table, which compared the values of Body Mass Index (BMI) through weighing (kg) and measuring height (m) with age. Bodyweight was measured using a scale, and height was measured using a microtome.

2.4 Research Instruments

The instrument in this study used the Global Physical Activity Questionnaire (GPAQ). The GPAQ instrument is useful for measuring the level of physical activity originating from WHO. In comparison, Food Frequency Questionnaire (FFQ) instrument of the Ministry of Health of the Republic of Indonesia is to measure the frequency of eating in a day, consumption of milk in a day, consumption of snacks in a day, soft drinks in a week, consumption of fast food in a week, consumption of junk food in a week, consumption of fruit in a week, consumption of vegetables in a week.

2.4.1 Definition of Obesity

Obesity is a condition of the accumulation of excess fat in the body. Obesity in children is a medical condition characterized by an above-average body weight index (BMI). Children with obesity are one of the public health problems that can harm children in the future (Camara-Lopes et al., 2013; Jannah & Utami, 2018; Reilly et al., 2003).

Obesity criteria in children can be measured using a Body Mass Index (BMI) chart adjusted for age, weight, height, and sex of the child. Z scores for Height/Age and BMI/Age were calculated using the WHO Anthro Plus program (Kemenkes RI, 2011).

According to Kemenkes RI, the Height/Age z-score data are categorized as follows:
  1. > 2 SD to + 3 SD: Obesity
  2. 1 SD to + 2 SD: Overweight
  3. -2 SD to + 1 SD: Normal.

In addition, the determination of obesity and overweight in children can be determined through the following index :
 A. For children ≤ 5 years (WHO, 2021a)
   1. Overweight : > +1 SD (equivalent to BMI 25 kg/m2 at 19 years)

2. Obesity: > +2 SD (equivalent to BMI 30 kg/m2 at 19 years)
3. Thinness: < -2sd >

B. For children >5 years (World Health Organization (WHO), 2021)
   1. Overweight : >+2 SD above WHO Child Growth Standards median (Weight for Height)
   2. Obesity : >+3 SD above the WHO Child Growth Standards median (Weight for Height).

2.5 Data Analysis

The analysis used in this study is univariate analysis. The univariate analysis will describe the incidence of obesity in early childhood in Medan Deli District in 2019, then describe the demographic characteristics, physical activity, eating patterns and exposure to cigarettes.

3 RESULT

The results of the research conducted are as follows:

Table 1: Frequency Distribution of Respondents Demographic Characteristics (n = 210).

Variable	N	%	95% CI
Sex			
Boy	115	54.8%	48.2 - 61.9
Girl	95	45.2%	38.1 - 51.8
Age (months)			
36 – 49	16	7.6%	3.9 – 11.4
50 – 63	162	77.1%	72.0 – 84.1
64 - 77	32	15.2%	10.1 – 20.0
Father's Education Level			
Low (SD and SMP)	43	20.5%	15.7 - 25.4
High (high school and university)	167	79.5%	74.6 - 84.3
Mother's Education Level			
Low (SD and SMP)	35	16.7%	11.4 - 21.0
High (high school and university)	175	83.3%	79.0 - 88.6
Father's occupation			
Does not work	2	1.0%	0.0 - 2.4
Teacher/ TNI/ Satpol PP	32	15.2%	10.5 - 20.0
entrepreneur	125	59.5%	51.0 - 65.6
Merchants	21	10.0%	5.7 - 13.3
Labour/ Driver	30	14.3%	9.7 - 20.0
Mother's Job			
Housewife	174	82.9%	78.6 - 88.6
Teacher	16	7.6%	3.9 -11.3
Midwife	1	0.5%	0.0 - 1.4
Merchants	8	3.8%	1.4 - 6.7
entrepreneur	11	5.2%	2.4 - 7.6
Parents' Income Level			
Low (≤ Rp. 1.000.000,-)	3	1.4%	0.0 - 3.8
Medium (Rp. 1.000.000 - Rp. 2.000.000,-)	46	21.9%	16.2 - 28.4
High (> Rp. 2.000.000,-)	161	76.7%	71.0 - 81.9
Parental Obesity History			
Obesity	26	12.4%	8.1 - 17.1
No Obesity	184	87.6%	82.9 - 91.9
BMI/U Status			
Obesity (>2SD)	29	13.8%	9.0 - 19.0
Fat (> 1 SD to 2 SD)	28	13.3%	9.0 - 18.0
Normal (-2 SD to 1 SD)	136	64.8%	58.2 - 71.6
Underweight (-3 SD to < -2 SD)	9	4.3%	1.9 - 7.0
Very Thin (< -3 SD)	8	3.8%	1.4 - 6.5

Based on table 1, the majority of respondents are girl (54.8%), with a maximum age of 50-63 months (77.1%), having a father and mother with a high level of education (79.5%) and (83.3%), most of the respondents' fathers work as entrepreneurs (59.5%), and the mother's occupations are mostly housewives (82.9%), the majority of respondents' parents have high incomes above Rp. 2.000.000,- (76.7%). About 12.4% of respondents have parents with a history of obesity and 13.8% of the 210 respondents have obesity BMI/U status that is >2 SD.

Table 2: Frequency Distribution of Respondents Demographic Characteristics with Obesity Status (n = 29)

Variable	N	%	95% CI
Sex			
Boy	14	48.30%	32.0 - 70.4
Girl	15	51.70%	29.6 - 68.0
Age (months)			
36 – 49	1	3.40%	0.0 - 14.8
50 – 63	24	82.80%	66.9 - 96.0
64 – 77	4	13.80%	2.9 - 26.0
Father's Education Level			
Low (SD and SMP)	8	27.60%	10.7 - 41.2
High (high school and university)	21	72.40%	58.8 - 89.3
Mother's Education Level			
Low (SD and SMP)	5	17.20%	3.3 - 33.3
High (high school and university)	24	82.80%	66.7 - 96.7
Father's occupation			
Does not work	0	0.00%	-
Teacher/ TNI/ Satpol PP	8	27.60%	13.3 - 46.0
Entrepreneur	18	62.10%	43.2 - 78.7
Merchants	1	3.50%	0.0 - 11.0
Labor/ Driver	2	6.80%	0.0 - 19.0
Mother's Job			
Housewife	25	86.20%	73.2 - 97.3
Teacher	2	6.80%	0.0 - 18.7
Midwife	1	3.50%	0.0 - 15.0
Merchants	0	0.00%	-
Entrepreneur	1	3.50%	0.0 - 11.2
Parents' Income Level			
Low (≤ Rp. 1.000.000,-)	1	3.50%	0.0 - 11.5
Medium (Rp. 1.000.000 - Rp. 2.000.000,-)	4	13.80%	3.0 - 29.6
High (> Rp. 2.000.000,-)	24	82.70%	68.2 - 95.6
Parental Obesity History			
Obesity	17	58.60%	38.5 - 77.0
No Obesity	12	41.40%	23.0 - 61.5

Based on table 2, the majority of obese respondents are girl (51.7%), with a maximum age of 50-63 months (82.8%), having a father and mother with a high level of education (72.4%) and (82.8%), most of the respondents' fathers work as entrepreneurs (62.1%), and the mother's occupations are mostly housewives (86.2%), the majority of respondents' parents have high incomes above Rp. 2,000,000,- (82.7%), and also has a history of obesity (58.6%).

Table 3: Physical Activity of Respondents with Obesity Status (n = 29)

Variable	N	%	95% CI
Never	1	3.50%	0.0 - 12.1
Rarely (1 time a week)	15	51.70%	35.6 - 71.4
Often (3 times a week)	13	44.80%	25.0 - 60.8

Based on table 3. one respondent who is obese never does physical activity (3.5%), and the majority rarely does physical activity (1 time a week) (51.70%).

Table 4: Frequency of Respondents' Daily Physical Activity Time with Obesity Status (n = 29)

Variable (minutes)	N	%	Mean	Min	Max	SD	95% CI of Mean
5 - 31	5	17.2%					4.0 - 33.1
32 - 58	0	0.0%					-
59 - 85	7	24.1%					10.9 - 38.9
86 - 112	3	10.3%					0.0 - 22.9
113 - 139	8	27.6%	99.83	5	210	58,653	11.8 - 45.4
140 - 166	0	0.0%					-
167 - 193	4	13.8%					3.7 - 29.9
194 - 220	2	6.9%					0.0 - 16.0
221 - 247	0	0.0%					-

Based on table 4, there are 17.2% of obese respondents do a physical activity only for 5 – 31 minutes a day. The average physical activity of obese respondents is 99.83 minutes per day or about 1.6 hours

Table 5: Dietary Patterns of Respondents with Obesity Status (n = 29)

Variable	N	%	95% CI
Breakfast Every Morning			
Breakfast	27	93.10%	81.1 – 100
No Breakfast	2	6.90%	0.0 - 18.9
Consumption of Milk			
Yes	22	75.90%	59.1 - 91.7
Not	7	24.10%	8.3 - 40.9
Type of Milk Consumed			
Sweet Thick	6	27.30%	9.7 - 52.2
Powder	12	54.50%	29.2 - 78.7
Fresh/ Liquid	4	18.20%	3.9 - 35.8
Like Consumption of Snacks			
Yes	23	79.30%	64.8 - 92.6
Not	6	20.70%	7.4 - 35.2

Based on table 5, 93.1% of obese respondents eat breakfast every morning and 24.1% do not drink milk. 27.3% of obese respondents consume sweetened condensed milk and like to eat snacks (79.3%).

Table 6: Frequency Distribution of Respondents' Eating Patterns with Obesity Status (n = 29)

Variable	N	%	Mean	Min	Max	SD	95% CI of Mean
Number of meals in a day							
2 times	0	0.00%	3.10	3	4	0.310	-
3 times	26	89.70%					77.4 - 100
4 times	3	10.30%					0.0 - 22.6
Amount of Milk Consumption in a Day							
Never	7	24.10%	1.52	0	3	1,122	9.2 - 40.7
1 time	7	24.10%					7.5 - 43.7
2 times	8	27.60%					9.9 - 47.1
3 times	7	24.10%					9.8 - 41.2
Amount of Snack Consumption in a Day							
Never	1	3.50%	2.52	0	7	1,595	0.0 - 13.0
1 time	8	27.60%					10.8 - 47.2
2 times	7	24.10%					9.8 - 41.2
3 times	13	44.80%					23.3 - 62.6
Consumption of Soft Drinks in a Week							
Never	1	3.50%	2.21	0	4	1.082	0.0 - 13.0
1 time	8	27.60%					10.8 - 47.2
2 times	7	24.10%					9.8 - 41.2
3 times	13	44.80%					23.3 - 62.6
Consumption of Fast Food in a Week							
Never	7	24.10%	1.66	0	5	1,565	7.2 - 43.8
1 time	11	37.90%					19.4 - 54.4
2 times	3	10.30%					0.0 - 24.2
3 times	8	27.60%					10.6 - 46.7
Consumption of Junk Food in a Week							
Never	1	3.50%	3.59	0	7	1,763	0.0 - 11.5
1 time	2	6.90%					0.0 - 17.5
2 times	3	10.30%					0.0 - 25.0
3 times	23	79.30%					61.5 - 95.1
Consumption of fruit in a week							
Never	2	6.90%	3.52	0	7	2,544	0.0 - 17.5
1 time	6	20.70%					6.6 - 38.5
2 times	3	10.30%					0.0 - 24.5
3 times	18	62.10%					42.8 - 82.2
Consumption of Vegetables in a Week							
Never	3	10.30%	4.1	0	7	2,623	0.0 - 21.7
1 time	4	13.80%					0.0 - 30.0
2 times	2	6.90%					0.0 - 16.7
3 times	20	69.00%					52.5 - 87.8

Based on table 6, 10.3% of obese respondents eat 4 times a day and 24.1% do not drink milk. And that 44.8% of obese respondents consumed snacks and soft drinks 3 times, with the most consumption being 7 times and 4 times a day. 27.6% of obese respondents consumed fast food 3 times, with the most consumption being 5 times a week. 79.3% of obese respondents consumed junk food 3 times, with the most consumption 7 times a week. There are 6.9% of obese respondents who never eat fruit and 10.3% who never eat vegetables.

Table 7: Cigarette Exposure of Respondents with Obesity Status (n = 29)

Variable	N	%	95% CI
Living With Smokers			
Yes	21	72.40%	53.2 - 88.4
Not	8	27.60%	11.6 - 46.8
Smoking area			
In the room	14	66.70%	46.2 - 85.3
Outdoors	7	33.30%	14.7 - 53.8
Cigarette Type			
Non Filter Cigarettes	2	9.50%	0.0 - 23.9
Cigarette Filter	19	90.50%	76.1 - 100.0

Based on table 7, the majority of obese respondents live with smokers (72.4%), that smoke the most in indoors (66,7%), with the most consumed type of cigarette is filter cigarettes (90,5%).

Table 8: Frequency Distribution of Respondents' Cigarette Exposure with Obesity Status (n = 29)

Variable	N	%	Mean	Min	Max	SD	95% CI of Mean
Length of Stay with Smokers							
2 Years	2	9.50%					0.0 - 23.7
> 2 - 3 Years	4	19.10%	4.33	2	6	1,155	5.2 - 35.0
4 Years	15	71.40%					54.7 - 90.5
How long does a child inhale cigarette smoke in a day							
Never	5	23.80%					5.3 - 42.6
Rarely (< 3 Hours)	3	14.30%	1.38	0.5	3	0.958	43.3 - 85.7
Often (≥ 3 Hours)	13	61.90%					0.0 - 31.1
Length of Children with Smokers in a Week							
Never	5	23.80%					5.6 - 46.5
Rarely (< 3 days)	1	4.80%	4.95	1	7	3,122	0.0 - 16.7
Often (≥ 3 days)	15	71.40%					50.0 - 90.2

Based on table 8, respondents who are obese mostly live with smokers for 4 Years (71.4%) with an average stay of 4.3 years. 61.9% of obese respondents often inhale cigarette smoke in a day approx3 hours, and the average respondent is obese with smokers a week for almost five days a week.

4 DISCUSSION

4.1 Sex

The results showed that the majority of obese children were girls (51.7%). The sexes of boy and girl have different tendencies in obesity in children, where the sexes differ in their intake and food. This is in line with Lindhom's research (2019) that the proportion of overweight in early childhood is higher in girls (10.6%) than boys. (7.9%), as well as obesity status is more common in girls (2.5%) than boys (2%) (Lindholm, 2019; Malik & Bakir, 2006). However, Suriani's (2019) study showed that the incidence of obesity was higher in boys than girls because boys more have a large appetite than women and require more energy and intake (Suriani, 2019).

4.2 Age

The results showed that the most obese children aged 56-60 months or equivalent to 4-5 years (82.7%). The incidence of obesity occurs in adults and occurs in many age groups of children. According to Lindholm's research (2019), early childhood 5 years (42-60 months) were significantly more overweight and obese. However, based on Faridah & Indriani (2017) research, the most obese preschool children are aged >5 years (Faridah & Indriani, 2017; Lindholm, 2019).

4.3 Education

The results showed that children with obesity status had fathers and mothers with high levels of education, namely (72.4%) and (82.8%). Parents' education level has a positive correlation with the incidence of being overweight (overweight), where the better the socioeconomic status of the parents, the more likely they are to change their children's eating habits. So that the incidence of childhood obesity in this study is a sign of high levels of social status, fertility and parental welfare; however, this is not following the previous researches which shows that children with obese status have parents with low levels of education (de Munter et al., 2016; Sartika, 2011).

4.4 Income

The results showed that children with obesity status came from families with high incomes or above Rp. 2,000,000/month (82.7%). WHO (2000) states that income affects increasing household consumption, such as consuming foods high in fat and meat. Following Hadi's research (2005), obesity tends to occur in children who come from high-income families because family income supports the ability to buy fast food that is high in energy. Parents with high incomes tend to give sizeable pocket money to their children. With a large enough pocket money, children usually consume everyday foods such as junk food and fast food (Hadi, 2005; WHO, 2000).

4.5 Obesity History

The results showed that most obese children had parents with a history of obesity (58.6%). Haines et al. (2007) showed that obesity in parents has a positive relationship with the incidence of obesity in children. Genetic factors are associated with weight gain, BMI, waist circumference and physical activity. If the father and/or mother are overweight (overweight), then there is a 40-50% chance that the child will also be overweight (obese), but if both parents are obese, then there is a 70-80% chance that the child will also be obese (Haines et al., 2007).

4.6 Physical Activity

The results showed that the majority of obese children rarely did a physical activity or 1 time/week (51.7%), and the most time to do physical activity was 113-139 minutes/day (28.6%), with physical activity in the form of playing soccer, playing bicycles, and playing catch-up. According to Brambilla (2011) research,

children do physical activity at least 3 times a week to train muscles and bones as a process of energy expenditure in preventing obesity in children (Brambilla et al., 2011).

According to the Australian Government Department of Health, toddlers and preschoolers perform active activities for 3 hours a day to prevent obesity (Australian Government Department of Health, 2021). Following research conducted, children who are declared obese carry out the physical activity for 113 to 139 minutes or about 2 hours per day. Doing physical activity every day is very beneficial for the body. In addition to getting a healthy body condition, it is also beneficial for mental health and entertainment in preventing stress. Low physical activity is a factor that can affect the occurrence of obesity in children, so that the role and support of parents are needed in children's physical activity activities to prevent obesity (Kurniasih et al., 2010; Mustelin et al., 2009).

4.7 Consumption of Milk

The results showed that most obese children liked to drink milk (75.9%), with an average consumption of 2 times/day, with the type of milk consumed in the form of powdered milk (54.5%). Similar research was also produced by Dougkas et al. (2019), which showed that obese preschool children aged 2-6 years always consume energy drinks derived from dairy sources, such as low-fat milk, high-fat milk, and sweetened condensed milk (Dougkas et al., 2019).

4.8 Consumption of Soft Drink

The results showed that most obese children consumed soft drinks 3 times/week (44.8%). The habit of consuming various types of soft drinks can increase the occurrence of obesity. The risk is even higher than those who love fried foods. According to Faridah and Indriani (2017), there is a relationship between soft drink consumption and the incidence of obesity in children that children who consume soft drinks 2 times/week are obese (54.9%) and overweight (10.7%) (Faridah & Indriani, 2017).

Soft drinks usually contains sparkling (carbonated) water, sweeteners, and natural or artificial flavours. Sweeteners can be sugar, high fructose cereal syrup, fruit juices, sugar substitutes (in diet drinks) (Begunca, 2019).

4.9 Consumption of Fast Food

The results showed that obese children consumed fast food once per week (37.9%). According to Suryanti's research (2013), fast food contains a lot of sugar and fat, increasing the accumulation of calories in body fat tissue (Suryanti, 2013).

According to Hardinsyah's research (2012), the increasing incidence of childhood obesity at this time is caused by the consumption of fast food, which contains high calories and fat and is low in fibre, so that frequent consumption of fast food can lead to overweight and obesity in children (Hardinsyah, 2012).

Fast food is available quickly and ready to eat, such as fried chicken, pizza, burgers, french fries, pasta, nuggets, sausages, fried foods and so on such as KFC, hamburgers, pizza (Hardinsyah, 2012; Virgianto & Purwaningsih, 2016).

4.10 Consumption of Junk Food

The results showed that obese children consumed junk food 3 times/week (79.3%). According to Virgianto's research (2016), junk food can cause obesity because the content of junk food is high in sugar and fat, so children who often consume junk food can have risk factors for obesity (Virgianto & Purwaningsih, 2016).

Ashlesha and Nancy's research (2012) found that children who consumed junk food 3 times/week had a 3.28 times greater risk of being overweight (overweight) and obesity than those who rarely or 1-2 times/week. The high frequency of consuming junk food can increase the accumulation of calories in the body, causing an abnormal increase in BMI in children (Ashlesha & Nancy, 2012).

Junk food has a low nutritional content to little nutrition. However, junk food has a high-fat content and is not good for human health. Examples of junk food are candy, soft drinks, chocolate, potato chips or light snacks, ice cream, and much more (Musa, 2010).

4.11 Consumption of Vegetables and Fruits

The results showed that children with obesity status consumed vegetables and fruit as much as 3 times/week (69%) and (62.1%). The level of fruit and vegetable consumption determined by the Government of Indonesia and the Guidelines for Balanced Nutrition (PGS) is a minimum of 3 to 5 servings a day. One of the causes of overweight or obesity in children is the low consumption of vegetables and fruits (Anggraeni, 2016).

Consumption of vegetables and fruit is a source of fibre which is very important for children's growth, so it is closely related to the incidence of obesity in children. Children who are overweight (overweight) and obese need foods that are high in fibre. Based on the General Guidelines for Balanced Nutrition (PUGS), the recommended consumption of vegetables and fruit is at least 3 servings/day. To prevent obesity in children, it is always recommended to eat at least 3 servings of vegetables and fruit every day (Field et al., 2003; Kemenkes RI, 2003).

4.12 Cigarette Exposure

The results showed that most obese children lived with smokers (72.4%), and most lived for 4 years (71.4%). Smokers smoke the most indoors (66,7%), with the type of cigarette consumed in the form of filter cigarettes (90,5%). The majority of respondents often smoke cigarettes for 3 hours/day(61.9%) and often with a smoker while the smoker is smoking for 3 hours/week (71.4%). According to research by Cornelius et al. (2001), there is a positive relationship between exposure to cigarettes from the first year of birth and overweight (OR: 2.08, 95% CI: 1.02); this is in line with the meta-analysis conducted by Oken et al. (2007) that there is a relationship between mothers who smoke during pregnancy and after delivery, which is significantly related to the incidence of obesity in children (Cornelius et al., 2001; Oken et al., 2008).

The quantity of cigarettes smoking is associated with an increased risk of being overweight at 5 years of age. One cigarette smoked and inhaled per day by children can increase the risk of overweight and obesity in children. There is a significant relationship between exposure to cigarette smoke and the Z-Score BMI of children in the pooled analysis. Children who have one parent who smokes and are exposed to secondhand smoke 4 years experienced an increase in the BMI Z-Score value of 0.27 SD (95% CI: 0.08-0.47), and for children who have two parents who are smoking, experienced a higher BMI Z-Score value increase of 0.39 SD (95% CI: 0.14-0.65) compared to children who did not have parents who smoked (Robinson et al., 2016).

5 CONCLUSION

The incidence of obesity in early childhood in Medan Deli District is generally occurred due to heredity,

rarely do physical activity, often consume milk, soft drinks and junk food, and exposure to cigarette smoke.

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