Investigating the Relationship between Obesity and Related Factors in School Children.

Arezoo Shayan[1], and Sedighe Forouhari[2]*.

[1]Department of Midwifery, School of Nursing and Midwifery, Hamadan University of Medical Sciences, Hamadan, Iran.
[2]Social Determinants of Health Research Center, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.

ABSTRACT

Obesity and overweight are the major problem among children and adult in developed countries. The most important risk factors for childhood obesity and overweight are obese parent, socioeconomic condition, birth weight, breast feeding etc. Breast feeding is the most important strategies for reducing childhood obesity and overweight. Due to the threats followed by obesity the aim of this study is investigating the relationship between childhood obesity and those related factors which affects children. This is a case-control study which was conducted on 400 daughter students in the second grade of primary school in 2014. In this study, case group consisted of a number of 200 obese and overweight children and control group consisted of a number of 200 normal weight children that were selected by cluster sampling and the data were analyzed by SPSS version 21. Average and standard deviation of mother's age during pregnancy in case group was 32±5 (years) and in control group was 24±3 and a significant variance was observed between the groups. Among the investigated variances, BMI (p=0.01), type of the milk (breast milk+ powdered milk) (p=0.0021), the age of introducing complementary feeding (p=0.028), birth weight and obesity (p=0.005) were significantly associated with overweight and obesity in children. Results showed that breast feeding has a protective effect on overweight and obesity in childhood and also obesity in childhood is related to mother's weight, the age of starting complementary feeding, birth weight, type of the milk during infancy.

Keywords: breast feeding, body mass index, obesity, overweight, children.

*Corresponding author

INTRODUCTION

Nowadays obesity is a public health problem [1]. The prevalence of obesity not only among the adults but also particularly in children and adolescents is increasing as the most common nutritional disorder among children and adolescents in the United States [2, 3]. Worldwide one out of every 10 children and about a number of 30 to 45 million children are afflicted by obesity and overweight [4]. The finding of produced of various researches have shown that the prevalence of obesity is between 7-16 %[5]. Childhood obesity is determined by body mass index, and is defined greater or equal to the 95th percentile of age and sex [6]. Over the last few decades the rapid rise in childhood obesity have often been the result of increase in food intake and also the change of active lifestyle into sedentary lifestyle[7]. Obesity as a global problem is propounded by world health organization that should be considered as a great public problem [4]. Which is the major risk factor for cardiovascular disease and diabetes. According to researches studies, increase in waist circumference indicates as abdominal obesity and elevated waist to height ratio as an indicator of increase cardiovascular and metabolic disease [5]. Obese children with high blood pressure are more susceptible to the development of both cardiovascular and metabolic disease in the future [8]. It is believed that several factors are causing obesity which environmental factors, lifestyle and social factors are significant as the main causes of increasing the prevalence of obesity around the world [9]. Complication of childhood obesity in adulthood reveals the importance of this issue. Disease such as diabetes 2, high blood pressure, cardiovascular problems beside psychological effect endanger one's health. According to the recent report, 50 percent of obese children carry their obesity to the adulthood and also are afflicted by metabolic syndrome Most of the fulfilled studies have done in order to assessing obesity in childhood by body mass index [BMI] because it is believed that the index would be a valid criteria for assessing among the children and adults [10]. Many researches discusses the prevalence of obesity in childhood regardless of the causative and prevented factors. In a sampling –sectional study involving 471 student that was carried out in two stages, showed that there is no significant difference between obese and none obese groups in terms of parental education , number of family member, and also family antecedent obesity. Obesity in mother is one of the risk factors for children and also it's prevalence in children from sparse populated family is more current due to the more parental attention [11]. In another study the significant difference of the prevalence obesity between obese and none obese students have shown, there was a positive and significant correlation between, time spent for watching TV, playing computer and other electronic stuff with body mass index in obese children. Sleep time and physical education in obese student are significantly less than none obese student [12]. The first few days of life is one of the important period in life for every person because we are observing the process of evolution beside growth, therefore this period is vitally important due to the etiology of chronic disease. The present studies indicating, the infant's nourishing statue, breast feeding and fore more specific the duration of breast feeding in order to determine the weight in adulthood. Avery change in composition of breast milk leads to satiety signal in children but in glass feeding the volume of stomach ascertain the satiety and may leads the children to overweight [13,14]. In another side the inverse correlation has been reported between the length of breast feeding and increasing obesity [15]. In this study environmental factors and nourishing role of breast feeding were examined due to the importance of breast feeding, some other related factors and also various achieved results in other studies.

METHOD

In this case-control study, the second grade of elementary female school were investigated by cluster sampling. Regarding to the prevalence of obesity and overweight in other studies, 400 subjects whose age ranged from 7 to 8 years old, were selected and divided in two groups, 200 child who had obesity or overweight were selected as case group, and 200 child who were neither obese nor over weighted were selected as control group. Their height and weight were measured and their BMI was calculated by dividing weight (Kg) by height square.

The branch mark of obesity in case group was having the body mass index over 95th percentile for age and sex and the branch mark of lack of both overweight and obesity in control group was having the body mass index less than 85th percentile for age and sex. Lack of overweight and obesity was defined as a normal weight. Parents were invited in order to complete some prepared questionnaire on demographic information as the number of family member, breast feeding statues, age and parent's anthropometric index. Mother's height and weight was measured and data was analyzed by using SPSS/21 a statistical software and also chi square test (man whitney).

Findings:

Most of the mothers (51%) have gotten middle school degree. According to table 1 there was no clear distinction regarding to the average of father's age but about the average of mother's age not only a significant distinction was considered in the term of mother's age in both case and control group (p=0.04) but also the distinction of BMI was significant in both group (p=0.01). The other study was about smoking during pregnancy that no significant distinction was considered.

Table (1): Age , smoking and BMI index in both case and control groups			
variable	case	control	P value
Mother's age during pregnancy	32±5	24±3	0.04
Father's age in child birth	33±6	38±3	0.89
Mother BMI			
Thin	1(0.5%)	10(5%)	0.01
Normal	58(29%)	105(52.5%)	
over weight	68(34%)	48(24%)	
Obese	73(36%)	37(18.5%)	
Smoking by mother during pregnancy			
Yes	48(24%)	30(15%)	0.81
no	152(76%)	170(85%)	

According to graph (1), 35.5% of children in case group placed in second level of family and 40% of control group placed in first level with high percentage among others. And regarding to the birth order there was no significant distinction.
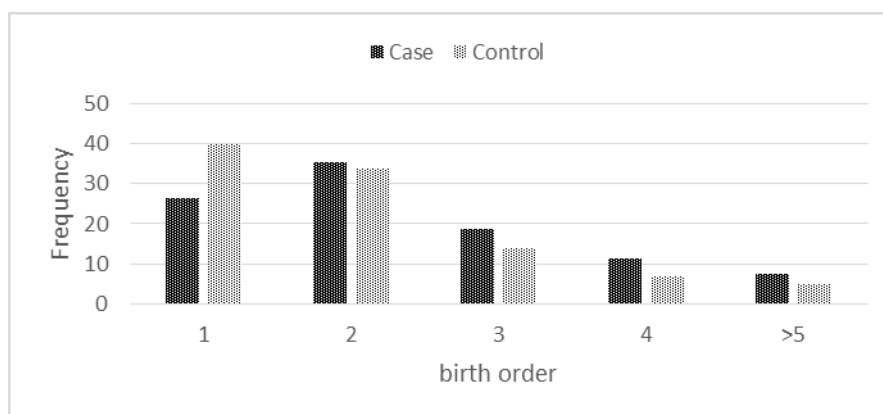
Graph 1: frequency distinction of student's birth order in both case and control group

According to graph (2), 77.5% of student in case group and 90% of student in control group were fed with breast milk and 48% of student in case group and 51.5% of student in control group were fed with breast milk over 12 months. The chi-square test didn't demonstrate any significant relationship between both case and control group regarding to the duration of breast feeding.19% of student in case group were fed with both formula and breast feeding during infancy and 60% of student in control group were fed just with breast milk during infancy. The correlation between type of milk which children were fed by, obesity and overweight in both group were significant (p=0.0021).In case group 35.5% of children had started complementary feeding from 4-6 months of age and in control group 48% of children had started complementary feeding after 6 months of age .Therefore there was a significant distinction were considered regarding to the starting age of complementary feeding, obesity and overweight (p=0.028) and also significant correlation was considered between birth weight, obesity and overweight (p=0.005) .And in case group 39% of children's birth weight were between 3500-4000 gram and in control group 40.5% of birth weight were reported between 2000-2500 gram.
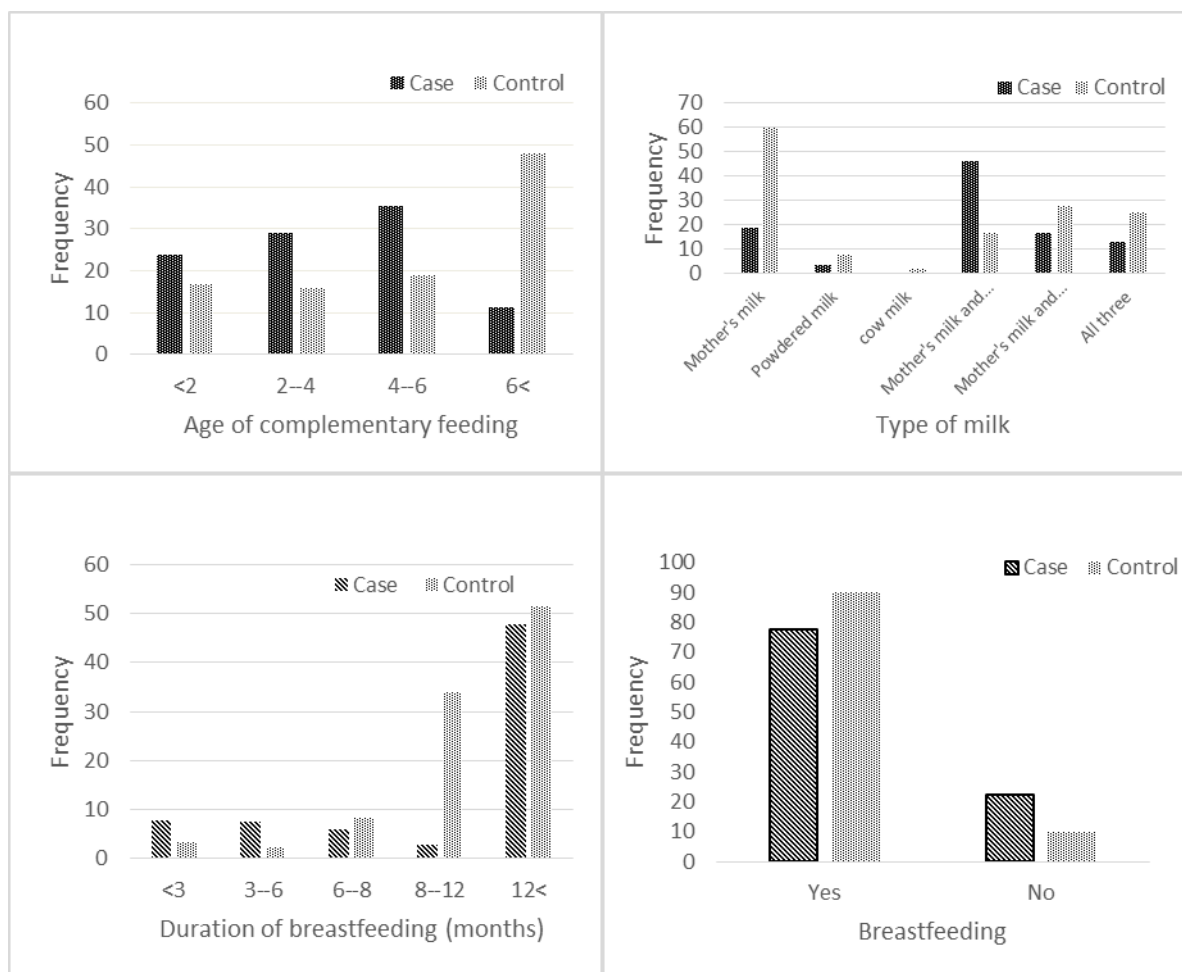
Graph 2: the features of breast feeding duration, onset of complementary feeding and type of milk in both case and control group

DISCUSSION AND CONCLUSION

A significant deviation was considered between the mother's age average between case and control groups. The archived data indicate that with increasing mother's age due to her experience in home affair administration and also parenting , the nutritional needs of children can be estimated better, these findings is consistent with Ramezankhani study[16]. This result shows whenever mother's education is high the prevalence of children's obesity is more common which probably it is because of mother's attention due to their awareness about children's nutritional needs. It seems that there is a correlation between the prevalence of obesity with families economic-social and cultural class but according to this study there was no significant association between obesity and overweight with birth order. These findings are also shown by previous studies [2,17] in a cross sectional study by using cluster sampling 325 students in 6-12 years old were examined , findings indicate that children's obesity had no significant association with birth order [18]. And also in another study about correlation between overweight and obesity with birth order which were done in an elementary school, there was no significant statistical correlation that Confirmed and supports the finding of this study [16]. The present study proved the significant correlation between mother's body mass index [BMI] with child obesity, parental obesity is one of the factors that not only increases the risk of childhood obesity, but also increases the risk of obesity after puberty [19]. Parental obesity have been reported in most of the studies in Iran and other part of the world and in another study in Mashhad city the significant correlation between parental BMI with children's BMI has been reported [20]. According to another study which has done in Spain, children in 12-14 years old were compared with control group and it was concluded that obesity in families is the greatest risk factor associated with childhood obesity [21, 23]. Another study in South Africa showed that, significantly obese mothers had more obese child [27]. Parental obesity especially

mother's obesity is one of the predisposed factors for childhood obesity which genetic and environmental factors can be the interpretive criteria for this issue. Parental obesity through genetic plays a role in children's obesity [27]. The result of present study implies that birth weight in obese children was significantly more than none obese one in which 39% of children's birth weight in case group were 3500-4000 gram and 40.5% of children's in control group were 2000-2500 gram. According to some studies in Britannia, China and Africa showed that the relevance of obesity has direct relationship with high birth weight [28]. Via correlation of high birth weight with increased risk factor of obesity in childhood and adolescence can be attributed to metabolic activities, endocrine and also autonomic pathways during embryonic development. The studies indicated that resting energy in people with high birth weight is less than others [29]. Results showed that exclusive breast feeding without use of other types of milk and also duration of breast feeding in obese children was less than children's in control group and the duration of breast feeding during infancy was associated with the prevalence of obesity and overweight in childhood. In a cross-sectional study Kramer and colleagues have considered that breast feeding was not associated with BMI in adolescence and adulthood [22, 30]. Some of the researchers are looking for risk factors of obesity, overweight and high BMI, the short duration of breast feeding can be mentioned. In another side the reason of the differences results, can be mentioned as the effect of confounding factors, age, number of samples, demographic and racial differences, the strength of statistical tests and also the duration of breast feeding was recognized as an effective factor in children's overweight in second grade of elementary school in this research. The studies which reported the relationship between breast feeding and it's duration with the risk of obesity considered this correlation due to some mediator factors that can be related to breast milk as adipocytes, leptin, insulin, ghrelin in breast milk or can be related to complementary foods or some other formula which are replaced with breast milk [21, 25, 31]. The different researches indicate that breast milk composition is effective to prevent obesity and overweight. Breast milk contains some factors which can be the stimulant of some other factors such as tumor necrosis factor and epidermal growth factor which is the inhibitor division and differentiation of fat cells and adipocytes. The ratio of protein to other nutrient material in breast milk can be effective in this correlation. The too much consuming of protein in formula milk can resulted in insulin secreting and also insulin-like growth factors [26, 32].in general, the protective effect of breast feeding against obesity is attributed to its Special compounds, breast milk by having high energy and low protein formula in comparison with powdered milk has many beneficial effects in which prevent the baby from getting protein more than needs. Long-chain fatty acids inhibit cytokine productions and increase the amount of insulin receptors in various tissues and improve insulin actions and some brain neurotransmitters. The complex interaction of the numbers of neurotransmitters, insulin and also it's receptors in the brain regulate the food intake, therefore the importance of getting these fatty acids in the first years of life becomes clear [8]. Result of this study showed that the onset of complementary feeding for children was significantly associated with overweight and obesity and 35.5% of case group, reported complementary feeding onset before 4-6 months. Such findings are consisted with the study of Bayegh and colleagues in which obesity has statistical significant with early onset of complementary feeding during infancy. Therefore early starting of complementary feeding, are likely accompanied with the getting less breast milk. Therefore, due to the benefits of breastfeeding, the risk of obesity increases [26, 28].

There was no significant association between mother's smoking during pregnancy increase and the risk of obesity but in another study which was done by Huus and colleagues, mother's smoking during pregnancy increases the risk of child obesity [25, 35]. According to the above findings, parental age, age of complementary feeding, birth weight, type of milk are associated with obesity and overweight in childhood. It is suggested that the other factors such as children's physical activities, the impact of chronic disease, psychological factors and similar factors be considered in future researches too.

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