The Prevalence of Obesity and Overweight in Iranian Primary School Students: A Systematic Review

Masumeh Saeidi[1], Maryam Naseri[2], Rahim Vakili[3], *Fatemeh Sistanian[4]

[1]Department of Medical Education, Faculty of Medicine, Tehran University of Medical Sciences, Tehran, Iran.

[2]Fellowship of Pediatric Intensive Care, Department of Pediatrics, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.

[3]Professor, Pediatric Endocrinologist, Mashhad University of Medical Sciences, Mashhad, Iran.

[4]Department of Nutrition, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.

Abstract

Background: Obesity is a critical nutritional issue in developed countries and has increased worldwide in recent decades. In childhood obesity, excess body fat negatively affects a child's health and well-being. This study investigates the prevalence of obesity and overweight in Iranian primary school students.

Materials and Methods: In this systematic review, a systemic search of online databases (Medline, EMBASE, Scopus, Web of Science, Cochrane Library, CIVILICA, SID, Magiran, and Google Scholar search engine) was conducted for related studies with no time limit up to February 2022, using the related Mesh keywords. Two reviewers evaluated the quality of eligible studies and carried out the selection procedure.

Results: The prevalence of obesity and overweight in primary school children was 14.3% (3.1-14.3%), and 18.8% (5.5-18.8%), respectively. Obesity and overweight were more prevalent in primary students from Semnan and less prevalent in students from Tabriz. Based on the results, the relationship of overweight and obesity in students with their age, gender, weight at birth, school type, taking snacks, walking time to school, family size, parental education, father's job, parental obesity, physical activity levels, and family income was significant ($p < 0.05$).

Conclusion: The prevalence of obesity and overweight was 14.3% and 18.8% among primary school students. Educational interventions to prevent and reduce this problem at the level of schools and families seem necessary.

Key Words: Iran, Primary school, Prevalence, Obesity, Overweight, Students.

***Corresponding Author:*

Fatemeh Sistanian, Department of Nutrition, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.

Email: sistanianf961@mums.ac.ir

1- INTRODUCTION

The Centers for Disease Control and Prevention (CDC) defines a body mass index (BMI) lower than the 5th percentile for age and gender as lean, between the 5th and 84.9 percentile as normal, between the 85th and 94th percentile as overweight, and equal to and above the 95th percentile as obese (1). Today, the increasing prevalence of overweight in children is one of the most critical public health problems in developed and developing countries, leading to various complications in childhood and adulthood (2, 3). Findings show that the prevalence of weight gain in children and adolescents in the Middle East is higher than in developing countries (4). Since 1998, the World Health Organization has reported Iran as one of the seven countries in the Middle East with the highest prevalence of childhood obesity (5, 6).

Various studies have been conducted in Iran on the prevalence of obesity in children and adolescents with different results (7-14). Many obese children will likely be obese in adulthood (15). Obesity is a known risk factor for hypertension, diabetes (17, 16), and hyperlipidemia (18), some types of cancer (19), liver disease (20, 21), gallstones (22), respiratory problems (23), osteoarthritis and infertility in women (24, 25), depression, and low self-esteem (2). Other complications of childhood obesity are its social and economic consequences such as low education, reduced income, and lower chance of marriage (27). Studies indicate that the prevalence of obesity in children and adolescents is increasing, and its consequences in adulthood are threatening. Due to the importance of the issue and the best age to prevent childhood obesity being 7 to 12 (28), the present study aimed to determine the prevalence of obesity and overweight in Iranian primary school students.

2- MATERIALS AND METHODS

The Preferred Reporting Items for Systematic review and Meta-Analysis (PRISMA) checklist was used as the template for this review (29).

2-1. Eligibility criteria

Participants, interventions, comparators, and outcomes (PICO) was used to formulate the review objective and inclusion criteria.

2-1-1. Participants: Iranian primary school students (aged: 7-12 years old).

2-1-2. Interventions: The included research are non-interventional studies, so we did not have a comparison group.

2-1-3. Comparison: We did not have a comparison group and intervention.

2-1-4. Outcome: Obesity and overweight.

2-2. Included studies: The review included studies containing any form of quantitative assessment, measurement, and evaluation of overweight and obesity in primary school students in Iran. The inclusion criteria were focusing on overweight or obesity among primary school students only, published up to February 2022, written in English or Persian, and using the BMI index exclusively (30). BMI is a measure of obesity by weight and gender based on CDC (31), and IOTF (32) indices in most studies (33). This measure was used due to its simplicity and non-invasiveness of anthropometric measurements in determining overweight and obesity in children.

2-3. Exclusion criteria: The exclusion criteria were abstracts without the full article, studies on high school students, use of diagnostic instruments other than the BMI index, CDC, 2000, and the International Obesity Task Force (IOTF) (IOTE), 2000, articles not written in English or Persian, review articles, meta-

analyses, letters to the editor, editorials, short reports, case reports, and briefs.

2-4. Information sources

A systemic search of electronic databases Medline, EMBASE, Scopus, Web of Science, Cochrane Library, CIVILICA, SID, Magiran, and Google Scholar search engine) was conducted. The search was done independently and in duplication by two reviewers, and any disagreement between the reviewers was resolved by the supervisor.

2-5. Search

Search words were a combination of (Students OR Primary school students OR Elementary students) AND (Obesity OR Overweight) AND (Prevalence).

2-6. Study selection

Database search was done for possible studies, abstracts were screened for eligible studies, full-text articles were obtained and assessed, and a final list of included studies was made. This process was done independently and in duplication by two reviewers, and any disagreement was resolved by the third reviewer. References were organized and managed using EndNote software (version X8).

2-7. Data collection process

A researcher form was developed and followed for each study. Two reviewers collected the data independently. The collected data were combined and compared for accuracy, and any discrepancies were solved by a third reviewer.

2-8. Risk of bias in individual studies

The risk of bias was assessed using the standard tool of STROBE (STrengthening the Reporting of Observational Studies in Epidemiology) positioning guidelines (34). STROBE is a valuable tool for evaluating the quality of observational studies. This checklist has 22 items, scored based on the importance of each item according to the present study. The final score of the checklist was 30, and the minimum score was 15.0. The assessment was done by two reviewers independently and in duplication, and any discrepancies were resolved by the third reviewer.

2-9. Synthesis of results

Due to the difference in the included studies, study designs, age groups in some studies, and sample size, a meta-analysis was not conducted.

3- RESULTS

Finally, 12 studies from 18 cities or territories, including 16,745 primary school students, were selected (**Figure 1**). The results showed that the prevalence of obesity and overweight in primary school children was 14.3% (3.1-14.3%), and 18.8% (5.5-18.8%), respectively. The main characteristics of the selected studies are summarized in **Table 1** and the following:

Table-1: General characteristics of included studies.

Author, Year, (Reference)	City/ Province	Gender	Age, year	Sample size	Prevalence (%) Overweight	Obese
Shahgholian et al., 2002, (35)	Chaharmahal and Bakhtiari	boy/girl	7-12	2,772	-	9.9
Hajian et al., 2006, (36)	Babol	boy/girl	7-12	1,000	12.3	5.8
Farrin et al., 2012-2013, et al., (37)	Tabriz	boy/girl	6-11	857	7.4	2.1
Khorramabadi et al. 2011-2012, (38)	Khorramabad	boy/girl	6-14	3,387	16.7	4.8

Noghabi et al. 2008, (39)	Bandar Abbas	boy/girl	7-11	1,350	10.9	6.2
Azarbayjani et al. 2010- 2011, (40)	Tehran	girl	7-11	488	19	14
MotamedRezaei et al., 2014, (41)	Birjand	boy	10-14	270	10	5.6
Habibi et al., 2013- 2014, (42)	Sanandaj	boy/girl	7-12	614	13.2	9.8
Nabavi et al., 2010, (43)	Semnan	boy/girl	7-12	400	18.8	14.3
Solki et al., 2010-2011, (44)	Shahryar	boy/girl	6-12	325	11.7	7.1
Tabatabaei et al., 2002, (45)	Ahwaz	boy/girl	6-12	3,482	-	CDC:5.2 LOTF: 3.6
Mozafary et al. 2002, (46)	Tehran	girl	7-12	1,800	13.3	7.7

CDC: The Centers for Disease Control and Prevention, LOTF: The International Obesity Task Force.
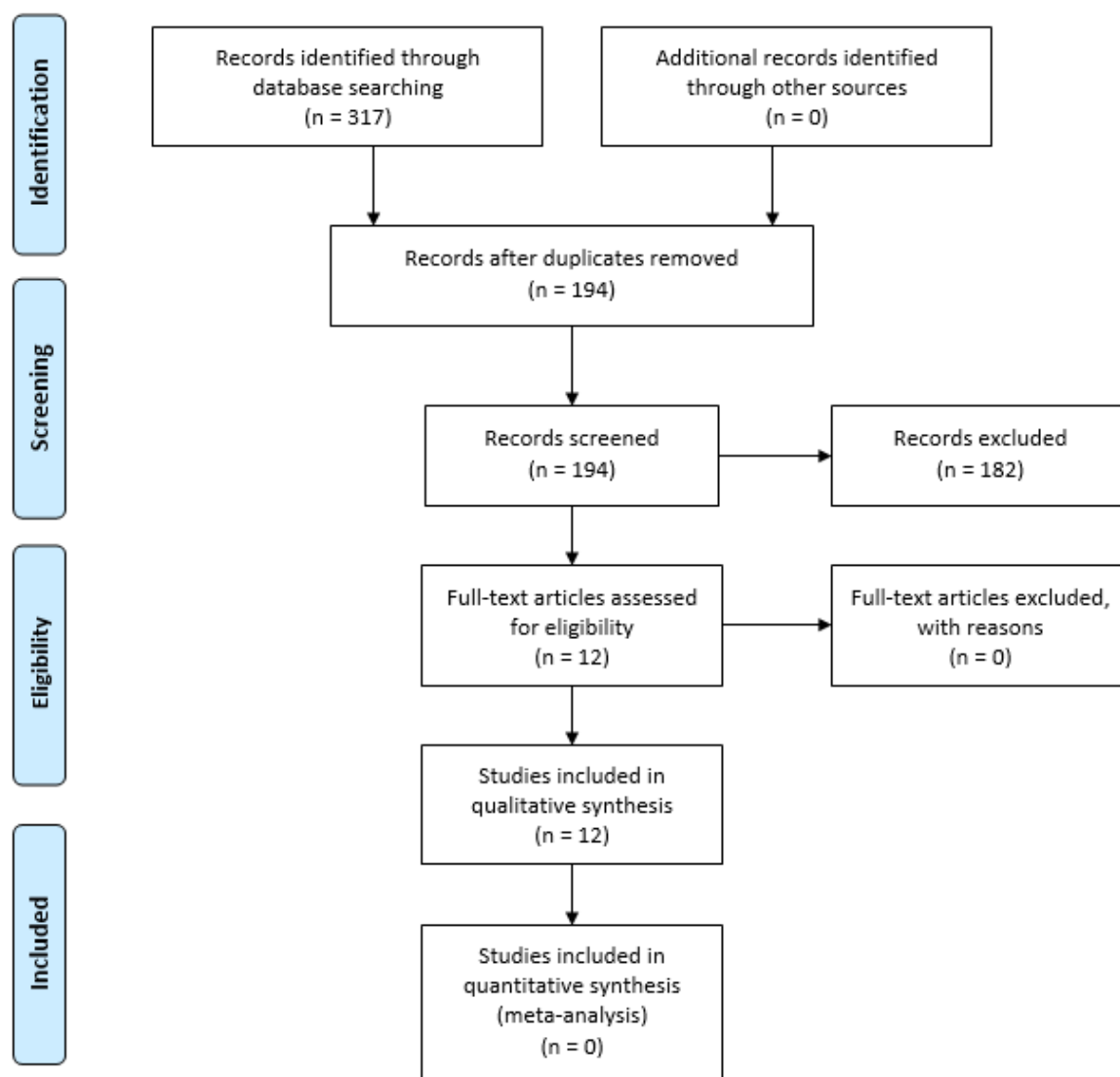

Fig.1: PRISMA flowchart.

1. A two-stage study on 2772 primary school boys and girls in Chaharmahal and Bakhtiari province in 2002 aimed to determine the 90th percentile of BMI and some risk factors of obesity in primary school children. The results showed that the prevalence of obesity in the students was 9.9%. Factors such as obesity in parents and first-degree relatives, consumption of specific foods, and mean birth weight (in girls) had a significant relationship with obesity (35).

2. A cross-sectional study on 1000 primary school students aimed to determine the prevalence of overweight, obesity, and underweight in primary school students in Babol in 2006. The results showed that the prevalence of underweight, overweight, and obesity in students was 13.5%, 12.3%, and 5.8%, respectively. The risk of obesity and overweight was growing among students with more literate parents. The prevalence of weight loss was higher in public schools. For each additional score of physical activity in leisure time, the chances of obesity and overweight reduced significantly (36).

3. A cross-sectional study was conducted on 857 primary school students of Tabriz in 2012-2013 to determine BMI in primary school boys and girls. The results showed that according to the BMI data, the prevalence of underweight, overweight, and obesity in the male students was 20.9, 5.5, and 3.1%, in female students, 18.8, 9.7, 0.9%, and in total 20.1, 7.4, and 2.1%, respectively. Overweight was more prevalent in female students (9.7%) than males (5.5%). However, the prevalence of obesity in the male students was approximately 3.5 times more than female students (p<0.05) (37).

4. A cross-sectional study on 3,387 students aged 6 to 14 in 2011-2012 aimed to determine factors of obesity and overweight in students of Khorramabad. The results showed a significant relationship between overweight and

obesity in students with the type of school, family size, parental education, and family income (p<0.05). Obesity and overweight were more prevalent in students of private schools and families with more income. Overweight and obesity were more prevalent in students whose parents had higher education (38).

5. A cross-sectional study was performed on 1,350 students (689 girls and 661 boys) aged 7 to 11 years in 2008 that aimed to estimate the prevalence of overweight and obesity in children in Bandar Abbas. The results showed that the prevalence of overweight was 12.8% in girls and 10% in boys. The prevalence of obesity was 6.2% in girls and 10.9% in boys. Obesity was significantly associated with gender, father's job, parents' education, and school type (p<0.05) (39).

6. A descriptive study on 488 elementary students (7-11 years) in the north of Tehran during 2010-2011 aimed to examine the relationship between obesity, physical activity, and socioeconomic status among girl students. The results showed that 14% of primary school girls were obese, and 19% were overweight. There was a negative correlation between BMI and physical activity (p<0.05), and a significant correlation between socioeconomic status and BMI (p<0.05) (40).

7. A cross-sectional study was conducted in 2014 on 270 boys in the fourth, fifth, and sixth grades of primary schools in Birjand in 2014, aimed to determine the prevalence of obesity and its relationship with food habits. The results showed that 10% of the students were overweight, and 5.6% were obese. There was a significant positive correlation between body mass index (BMI) and the daily intake of bread and cereals (r=0.17, p=0.006), milk (r=0.21, p=0.001), and meat substitutes (r=0.24, p<0.05). Also, there was a significant relationship between BMI and the age of students (r=0.13, p=0.037),

mothers' educational level (p=0.038), and fathers' job (p=0.018) (41).

8. A descriptive-analytic study on 614 students aged 7 to 12 in Sanandaj schools in 2013- 2014 aimed to investigate the epidemiology of obesity and overweight. The results showed that the prevalence of obesity and overweight were 9.8 percent and 13.2%, respectively. There was a significant relationship between overweight and obesity and gender, father's level of education, and breakfast (p<0.05) (42).

9. A cross-sectional study on 400 first- to fifth-grade students investigated the prevalence of obesity in children aged 7 to 12 in Semnan in 2010. The results showed that 14.3% of the students were obese, and 18.8% were overweight. There was a significant relationship between gender and obesity, so obesity was more common in boys and overweight in girls. Also, for each year of aging, the chance of obesity was 1.26 higher. There was a statistically significant relationship between obesity of parents and children, so for each unit of increase in maternal and paternal BMI, the chances of obesity in students were 1.18 and 1.15, respectively (43).

10. A cross-sectional study on 325 elementary students aged 6-12 in Shahryar in 2010-2011 aimed to determine the prevalence of obesity and its relationship with anthropometric measures and lifestyle. The results showed that the mean daily energy intake in obese children was 2381.74±308.95 compared to 1564.52±160.567 in healthy-weight children (p<0.05). Multiple logistic regression showed a significant relationship between the daily energy intake, duration of night sleep, meals during passive physical activity, and the father's body mass index with overweight and obesity (p<0.001). However, there was no significant relationship in terms of age, gender, leisure time activities, and birth order in this age group of participants (44).

11. A cross-sectional study on 3482 students aged 6-12 years old (1,843 boys and 1,639 girls) in Ahwaz primary schools in 2002 aimed to determine the prevalence of obesity using the three baseline values of IOTF, CDC, and local data from Iran. The results showed that the prevalence based on the Iranian reference data, CDC 2000, and IOTF 2000 was 10.9%, 5.2%, and 3.6%, respectively (45).

12. A cross-sectional study on 1800 female primary school students in Tehran in 2002 investigated the prevalence of obesity and its related factors in children. The results showed that the overall prevalence of obesity and overweight were 7.7% and 13.3%, respectively. There was also a statistically significant relationship between obesity, age, walking time to school, students' appearance, and students' mental perception of themselves (46).

4- DISCUSSION

This study investigated the prevalence of overweight and obesity in primary school students and the factors affecting it. A review of studies revealed that the prevalence of obesity and overweight in primary school children was 14.3% (ranged: 3.1-14.3%), and 18.8% (5.5-18.8%), respectively. There was a significant relationship between overweight and obesity with the students' age, gender, birth weight, school type, taking snacks, walking time to school, family size, parental education, father's job, parental obesity, physical activity levels, and family income (p<0.05).

The spread of urbanization and industrialization of societies and the replacement of physical labor with machines have reduced natural human activity. Immobility is one of the primary consequences of modern human life and disrupts the normal functioning of the body. This is even worse for children due to living in apartments and the lack of sports facilities for physical activity. The

resulting inactivity and reduced motor activities have led to overweight and obesity in children (47).

Obesity and overweight in children and adolescents due to the significant increase in its prevalence in recent years has attracted much attention. Today, obesity is a global issue, and many developed and developing countries are affected by this problem. Millions of dollars are spent annually from the budgets and resources of countries and families to reduce the prevalence of obesity and the treatment of related diseases. Regular physical activity and a healthy diet play a significant role in preventing obesity and overweight. Research has shown that obese adolescents have fewer friends than their peers and spend less free time with friends (48, 49).

Evidence suggests that childhood obesity and overweight are multifactorial diseases caused by a combination of genetic and environmental factors. Risk factors such as economic conditions, dietary patterns, and physical activity are known contributors (50). Environmental factors include access to high-fat foods, use of ready-to-eat foods, decreased physical activity (as a result of watching TV and using computers), overeating, obesity of parents (especially mothers), and parents' level of education, nutritional behavior, and eating habits. Economic and social effects and the child's exposure to diseases such as asthma increase the risk of childhood obesity (51, 52). Supporting social networks and physical environments (access to the physical activity equipment and shops) is effective in limiting or increasing the effect of determinants such as diet and physical activity in obese children (53).

These figures indicate that physical activity is a suitable preventive factor and should be considered in schools. This issue has been neglected due to economic factors and safety issues. Berkowitz states that inattention to appropriate physical activity in school contributes to obesity, and its prevention requires the cooperation of parents and schools (54). Informing parents about obesity in children and educating them on energy balance can be effective. A study in the United States showed that informing parents about the weight status of their children through health report cards and providing relevant data are suitable and effective ways to control obesity and overweight in children (55). Appropriate health culture and encouragement of physical activities such as walking, use of public transportation, use of bicycles, skates, or scooters, along with providing safety, can be effective in the mobility and increasing physical activity of students (56). The worst consequences of overweight and obesity on the health of children and adolescents are the increased risk of obesity, diabetes, cardiovascular diseases, and cancers in adulthood. As about 18.8% and 14.3% of children in the country are overweight and obese, it is necessary to develop and implement a national program to prevent and control these issues.

4-1. Study Limitations

One of the limitations of this study was the existence of different criteria for defining obesity and overweight.

5- CONCLUSION

The results showed a significant relationship between overweight and obesity in students with their age, gender (obesity was higher in boys and overweight in girls), birth weight, school type (private schools), taking snacks, walking time to school, family size, parental education, father's job, parental obesity, physical activity level, and family income (p<0.05). Obesity and overweight were more prevalent in students of private schools and families with more income. The prevalence of overweight and obesity was more in students whose parents had higher education. Multiple logistic regression showed that the daily energy

intake, duration of night sleep, meals during passive physical activity, and the father's body mass index had a significant relationship with overweight and obesity (p<0.001). The findings showed a significant positive correlation between BMI and the daily intakes of bread and cereals (r=0.17, p=0.006), milk (r=0.21, p=0.001), and meat substitutes (r=0.24, p<0.05).

6- CONFLICT OF INTEREST: None.

7- REFERENCES

1. Zareie M, Hamedinia M, Haghighi A, Chamari M, Broughani M. The epidemiology of obesity and underweight and their associations with physical activity and diet patterns among12 -14 years - old adolescent boys in Sabzevar, Iran. Payesh. 2011;10(2): 243 -5.

2. Dietz WH. Health consequences of obesity in youth: childhood predictors of adult disease. Pediatrics 1998; 101(3): 518-25.

3. Mahan LK, Escott Stump S. Krause's food, nutrition and diet therapy, 11th ed, USA, Saunders Co 2004; pp: 275-7.

4. Mirzaei MKM. Prevalence of Overweight and Obesity among the First Grade Primary Students in Yazd. Sci J Ilam Univ Med Sci. 2010; 18(14): 21-25.

5. Dehghan M, Akhtar-Danesh N, Merchant AT. Childhood obesity, prevalence and prevention. Nutr J. 2005; 4-24.

6. Kelishadi R, Hashemi Pour M, Sarraf-Zadegan N, Ansari R, Alikhassy H, Bashardoust N. Obesity and associated modifiable environmental factors in Iranian adolescents: Isfahan Healthy Heart Program−Heart Health Promotion from Childhood. Pediatrics International 2003; 45(4):435-42.

7. Shahgholian N, Aein F, Deris F. 90th percentile of body mass index (BMI) and some obesity risk factors among 7- 12 years old school children, Chaharmahal & Bakhtiari, 2002. Shahrekord University of Medical Sciences Journal. 2003;5:42-48.

8. Doost Mohammadian A, Keshavarz SA, Dorosti AR, Mahmoudi H, Sadrzadeh M. Survey of the nutritional status and relationship between physical activity and nutritional attitude with index of BMI-for age in Semnan girl secondary school, winter and spring,2004. Koomesh, Journal of Semnan Uneversity of Medical Sciences. 2005;6:187.

9. Janghorbani M, Parvin F. Prevalence of overweight and thinness in high school in kerman, Iran. Int J Obes Relat Metab Disord. 1998;22: 629-33.

10. Mozaffari H, Nabaei B. Obesity and related risk factors. Indian J Pediater. 2007;74: 265-67.

11. Moayeri H, Bidad K, Aghamohammadi A, Rabbani A, Anari S, Nazemi L, et al. Overweight and obesity and their associated factors in adolescence in Tehran, Iran, 2004-2005. Eur J Pediatr. 2006;165:489-93.

12. Mosavi Jazayeri MH. Overweight and obesity among school-aged children of metropolitan Tehran, Iran. Pakistan Journal if Nutrition. 2005;4: 342-44.

13. Kelishadi R, Haghdoost AA, Sadeghirad B, Khajehkazemi R. Trend in the prevalence of obesity and overweight among Iranian children and adolescents: a systematic review and meta-analysis. Nutrition 2014; 30(4): 393-400.

14. Torabi Z, Rabbani O, Ahmadiafshar A, Prevalence and risk factors of obesity among 2-5 year-old-children in Zanjan city in 2012. Scientific Journal of Zanjan 2015; 23(100): 116-25.

15. Cochran WJ. Pediatric obesity: A huge problem in the USA, Pediatrics. 2008.

16. Sinha R, Fisch G, Teague B, Tamborlane WV, Banyas B, Allen K, et al. Prevalence of impaired glucose tolerance among children and adolescents with marked obesity. NEJM. 2002; 346(11): 802-10.

17. Freedman DS, Khan LK, Dietz WH, Srinivasan SR, Berenson GS. Relationship of childhood obesity to coronary heart disease risk factors in adulthood: the Bogalusa Heart Study. Pediatrics. 2001; 108(3): 712-18.

18. Khalkhali Rad A, Roosta S, Fallahi E, Ebrahimzadeh F. Prevalence of obesity, overweight and underweight in school aged children and its association with some of

socio-demographic factors among the students of Khorramabad city in academic year. J Med Council Khorramabad. 2015; 1(1); 45-51.

19. Fernandez JR, Redden DT, Pietrobelli A, Allison DB. Waist circumference percentiles in nationally representative samples of African-American, European-American, and Mexican-American children and adolescents. J Pediatr. 2004; 145: 439-44.

20. Chen J-L, Kennedy C. Factors associated with obesity in Chinese American children. Pediatr Nurs. 2005; 31(2): 110-12.

21. Baigi F, Eshraghian M, Doroasti A. Prevalence of obesity among school children in neishabour (2005). J Qazvin Univ Med Sci. 2008; 12(1): 73-6.

22. James PT, Leach R, Kalamra E, Shayeghi M. The worldwide obesity epidemic. Obes Res. 2001; 4: 228-33.

23. Assar Sh. Prevalence of overweight and obesity among children of Ahwaz city aged 7-14. JSMJ. 2005; 44: 11-20.

24. Laquatra I. Nutrition for weight management In: Mahanl K, Escoll S. Krause's food, Nutrition and Diet therapy. 11th ed. USA: Saunder Pub. 2004; 558-90.

25. Flier YS. Obesity. In: Braun wald E. Harrison's principle of Internal medicine. 16th ed. New York: McGraw Hill Inc. 2005; 479-86.

26. Mirzaei MKM. Prevalence of Overweight and Obesity among the First Grade Primary Students in Yazd. Sci J Ilam Univ Med Sci. 2010; 18(14): 21-5.

27. Daniels SR. The consequences of childhood overweight and obesity. The Future of Children 2006;16(1): 47-67.

28. Garrow JS, James WPT, Ralph A. Human Nutrition and Dietetics. 10th ed. London: Churchill Livingstone Press; 2000.

29. Moher D, Shamseer L, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart LA; PRISMA-P Group. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. Syst Rev. 2015 Jan 1;4(1):1. doi: 10.1186/2046-4053-4-1.

30. Hosseini M, Carpenter R, Mohammad K. Growth charts for Iran. Annals of human biology. 1998;25: 237-47.

31. Kuczmarski RJ, Ogden CL, Grummer - Strawn LM, Flegal KM, Guo SS, Wei R, et al. CDC growth charts: United States. Advance data 2000:1 -27.

32. Cole TJ, Bellizzi MC, Flegal KM, Dietz WH. Establishing a standard definition for child overweight and obesity worldwide: international survey. BMJ. 2000; 320:1240.

33. Dietz WH, Bellizzi MC. Introduction: The use of body mass index to assess obesity in children. Am J Clin Nutr 1999; 70(suppl):S123-5.

34. Von Elm E, Altman DG, Egger M, Pocock SJ, Gotzsche PC, Vandenbroucke JP, et al. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: Guidelines for reporting observational studies. Preventive Medicine. 2007; 45(4): 247-51.

35. Shahgholian N, Aein F, Deris F. 90th percentile of body mass index (BMI) and some obesity risk factors among 7-12 years old school children, Chaharmahal & Bakhtiary, 2002. J Shahrekord Univ Med Sci. 2004; 5 (4): 42-8.

36. Hajian, K, Sajadi P, Rezvani A. Prevalence of Overweight and Underweight among Primary School Children Aged 7-12 Years (Babol 2006). JBUMS. 2008; 10 (3):83-91.

37. Farrin N, Pirouzpanah S, Dehgn P, Ostadrahimi A, Pirouzpanah S S, Alizadeh Khameneh N, et al . Assessment of Body Mass Index (BMI) in 6-11 Years Old Primary School Children in Tabriz City, Iran. Qom Univ Med Sci J. 2016; 10 (4):86-95.

38. Khorramabadi S., Saeidi Fard N., Ebrahimzadeh F., Fallahi E. Study of associated factors with obesity and overweight among students of Khorramabad city in 2011-2012. YAFTEH, 2017;19(71); 98-110.

39. Noghabi FA. Prevalence of obesity and overweight among children in Bandar Abbas. Journal of the Medical Science of Hormozgan. 2011;15: 218-6.

40. Azarbayjani M A, Tojari F, Habibinejad M. The relation between obesity, physical

activity and socioeconomic status among girl students living in northern Tehran. Feyz. 2011; 15 (2):132-38.

41. MotamedRezaei O, Moodi M, Tiyuri A, ZarShenas F, Sharifi M. Prevalence of obesity and its relationship with food habits among 10-14 years old school boys in Birjand, 2014: A short report. Journal of Rafsanjan University of Medical Sciences. 2016;14(12):1085-94.

42. Habibi Y, Pashaei T, Mansouri B, Gharibi F, Rezaei Z, ZandKarimi Z. Epidemiology of overweight and obesity among students 7 to 12 years old in Sanandaj city in 2013-2014. Zanko Journal of Medical Sciences. 2015 Sep 10;16(49):11-21.

43. Nabavi M, Karimi B, Ghorbani R, Mazloom Jafarabadi M, Talebi M. Prevalence of obesity and some related factors among students aged 7 to 12 in Semnan, Iran. Payesh. 2010; 9 (4) :443-451

44. Solki S, salehi L, jamshidi E. Obesity and Some Related Factors Among Students of Elementary Schools in Shahryar City. Iranian Journal of Endocrinology and Metabolism. 2013; 14 (5) :464-71.

45. Tabatabaei M, Dorosty AR, Siassi F, Rahimi A. Using different reference values to determine prevalence of obesity among schoolchildren in Ahwaz. Journal of School of Public Health and Institute of Public Health Research. 2004 Apr 10;2(1):11-8.

46. Mozafary H, Nabaie B. Prevalence of obesity and overweight in primary school girls in Tehran, Iran. Payesh. 2002; 1 (4) :15-9.

47. Marandi M. Prevention of risky behaviors in adolescents and young people. Isfahan; Pars Ilia: 2012.

48. Strauss RS, Pollack HA. Social marginalization of overweight children.

Archives of Pediatrics and Adolescent Medicine 2003; 157: 746-52.

49. Falkner NH, Neumark-Sztainer D, Story M, Jeffery RW, Beuhring T, Resnick MD. Social, educational, and psychological correlates of weight status in adolescents. Obes Res 2001; 9: 32-42.

50. National Health and Medical Research Council. National Clinical Guidelines for Weight Control and Obesity Management in Adolescents and Children. Common wealth of Australia: Canberra; 2002. Available from: URL: http://www.nhmrc.gov.au/.

51. Brantley PJ, Myers VH, Roy HJ. Environmental and lifestyle influences on obesity. J La State Med Soc 2005; Suppl 157: S19-27.

52. Behrman RE.; Kliegman RM. Nutrition and nutritional disorders. In: Behrman RE.; Kliegman RM. Nelson essemtials of pediatrics: From WB Saunders Company. 14th ed. 65-9, 2001.

53. Raine Kim. Overweight and Obesity in Canada: A Population Health Perspective. Canadian Population Health Initiative. Canada: 2004.

54. Berkowitz B, Borchard M. Advocating for the prevention of childhood obesity: A call to action for nursing. OJIN: The Online Journal of Issues in Nursing 2009; 14: 1-9.

55. Chomitz VR, Collins J, Kim J, Kramer E, McGowan R. Promoting healthy weight among elementary school children via a health report card approach. Arch Pediatr Adolesc Med 2003; 157: 765-72.

56. Lazzeri G, Pammolli A, Simi R, Pilato V, Giacchi MV. BMI from nutritional surveillance of 8-9 years old children in Tuscany (Italy). J Prev Med Hyg 2011; 52: 181-5.