Review Articles

The Relationship between Body Mass Index and Dental Caries in Children Aged 6 to 10 Years Old

Sogol Alesaeidi[1], Adibeh Rezaei[2], Amir Hossein Fathi[3], Behnaz Ghasemnia[4*]

1. Department of pediatric Medicine, Imam Hossein Hospital, Pediatric resident of Isfahan University of Medical Sciences, Isfahan, Iran. Orcid: 0009-0005-4928-6585

2. Department of Dentistry, Bushehr University of Medical Sciences, Bushehr, Iran. Orcid: 0009-0006-3462-9554

3. Assistant Professor, Dental Materials Research Center and Department of Prosthodontics, School of Dentistry, Isfahan University of Medical Sciences, Isfahan, Iran. Orcid: 0000-0003-2415-578X

4. Faculty of Dentistry, Golestan University of Medical Sciences, Gorgan, Iran. Orcid: 0000-0001-5621-8090

Corresponding Author: Behnaz Ghasemnia. Faculty of Dentistry, Golestan University of Medical Sciences, Gorgan, Iran. **Email:** ghasemnia.b@gmail.com

Abstract:

According to the many advances that have been made in the fight against diseases at the global level it souuld be said that dental caries and body mass are the multi-factorial diseases but are still considered as the most common diseases in the world which are studied along with body mass index (BMI) and dental caries index (DMFT) . In this study, which was conducted in a review method, we worked by using the key words such as BMI, DMFT, children. Searching in reliable scientific databases in Google Scholar, PubMed, Science Direct, Web of Science, Ovid Medline, WHO site, articles and theses published during the years 1998 to 2022, and finally 20 sources were selected and criticized, interpreted , was analyzed. It seems that due to the fact that both are multi-factorial indicators, as a result, some of the reviewed studies stated that these two indicators had a positive effect and others indicated that these two indicators had no effect. It is suggested that a supplementary study on the effect of these factors in relation to each other be done in the future.

Keywords: Body Mass Index, Dental Caries, Children.

Submitted: 28 May 2023, Revised: 15 June 2023, Accepted: 21 June 2023

[Downloaded from intjmi.com on 2026-09-06]

Introduction

Despite the efforts conducted to the prevent of the dental caries in children, it is still one of the common and preventable diseases of children. (1). in recent decades, dental caries is still considered as a serious problem in oral health around the world. Childhood dental caries in the United States is 5 times more common than asthma (2). Dental problems in childhood affect their growth by interfering with nutrition. It also has an effect on speaking and establishing social relations (3). Also, body mass is one of the health problems in today's modern societies which is steadily increasing in many countries. The prevalence of overweight and body mass in children and adolescents in developing societies is increasing (4). Weight gain and obesity are important health indicators, the frequency of which has been increasing in the last two decades. Body mass index (BMI) is one of the best indicators for evaluating overweight and obesity, so that according to the guidelines of the Center for Disease Control and Prevention (CDC), in children of different ages and sexes, the index is between the 85th and 95th percentiles of children. Exposed to the overweight line and indicators of more than 95 are signs of overweight children (5). Weight gain makes a person susceptible to some diseases including the effect on the dental caries in children. The DMFT index in permanent teeth and DMFT in milk teeth, which includes decayed, pulled and filled teeth due to decay, as well as the percentage of children free from decay, are two important indicators in evaluating the health of children in any society (6). Dental caries, like body mass is a multifactorial disease, which is still one of the most common diseases in the world due to the many advances that have been made in the fight against diseases at the global level (7, 8). Swaminathan et al. (9) investigated the relationship between body mass index and dental caries among children aged 3 to 12 years in India and concluded that there is no relationship between dental caries and BMI. The results of Bahr al-Uloomi et al.'s study (10) indicated a positive correlation between caries prevalence and body mass index. According to more or less contradictory reports, various studies regarding the existence of a relationship between body mass index and caries rate, the aim of this study is to review the relationship between body mass index (BMI) and dental caries index (DMFT) in children aged 6 to 12. It was a year.

Methods

In this study, which was conducted by a non-systematic review method (narrative review), using keywords including BMI, DMFT, children. Through searching in international scientific databases including: Pub Med, Web of Science , Google Scholar, Scopus, Elsevier, and internal scientific databases including: Barakat Knowledge System (Barakatkns), Academic Jihad Database, Iranian Medical Library (Medlib), National Journals Information Bank (magiran), Marja Knowledge (civilica) and search was conducted on the WHO website. A total of 56 scientific sources including books, articles, theses and reports in Persian and English languages from 1998 to 2022 regarding BMI, DMFT, children. It was published and collected. Irrelevant sources and articles were removed and relevant sources were studied. Finally, 38 articles and scientific sources were selected and analyzed considering the purpose of the study and according to the needs of 20 articles.

Results

The studies reviewed in this study have suggested different relationships between dental caries and body mass in children. Among these multi-factor relationships in the two indicators investigated in the studies, the following items can be mentioned:

1. Baby teeth compared to permanent teeth:

The reviewed studies did not show clear results of the relationship between the types of teeth (primary or permanent) with BMI, DMFT indices, but it seems that more studies show that young children with dental caries with primary teeth are thinner compared to children without caries. 11-13). Older and obese children are more susceptible to dental caries in their permanent teeth (14-16).

[Downloaded from intjmi.com on 2026-09-06]

2. Diet and eating habits:

In Talebi et al.'s study, no relationship was found between type of diet and dental caries index in preschool children of Mashhad (17). By studying children with dental caries, Sullivan and his colleagues found that these children used less milk and water and instead used more soda as a drink during the day (18). Also, Harris and his colleagues in England stated that it affects children's oral health by controlling plaque in such a way that a proper diet can prevent the development of tooth decay (19). In addition to the diet itself, chewing food can also affect the process of tooth decay, which in turn can lead to a decrease in the consumption of nutrients by children (20).

3. Lifestyle:

The lifestyle of the family and its impact on the lifestyle of the children may play a role in increasing or decreasing the indicators, for example, reducing physical activity and increasing the consumption of snacks, which will have an impact on two indicators. (21-22).

4. Economic-social status of the family:

Considering the provision of oral and dental health conditions from a child who needs education from the family, the role of the family in this field and paying attention to eating habits and personal hygiene and oral hygiene of children is more important than before (23). The results of studies have shown that the socio-economic status and education level of the family are effective on the dental health status and body mass index status of children (24-25).

Conclusion: Caries is a multifactorial disease that is affected by food composition, consumption pattern, quantity and quality of dental plaque, quantity and quality of saliva, host age and resistance, level of oral hygiene, composition of oral microorganisms and many other things. Nutrition is related to the health and psychological and social development of children. In addition to diet, there are some factors involved in dental caries such as oral microflora, age, use of fluoride, and social and economic status, all of these factors have effects. Dental caries and body mass as two multifactorial diseases are related to eating habits. In the studies conducted, different results have been obtained, including the relationship between BMI and dental caries in children, such as the study by Reifsnider and Willerhausen, who observed a positive relationship between BMI and dental caries and stated that an increase in BMI increases the risk of tooth decay in children. (26-28). While in a number of studies, a relationship between these two cases has not been found (29-32). The heterogeneity of the results regarding the relationship between dental caries and BMI in different studies can be caused by several factors, some of which include: different sample sizes, diverse application of BMI definition and classification criteria, application of different definitions and indices of tooth decay, and control and lack of control of confounding factors can be (33). Considering that healthy and appropriate nutrition is one of the main factors of body health, including mouth and teeth health, this matter is of particular importance in children. Because children in preschool and primary school age need healthy and sufficient nutrition for their physical growth and development. Establishing proper eating habits from the beginning of life not only improves the physical growth and development of the child, but also provides a suitable environment for optimal oral health (34). It seems that due to the fact that both are multi-factorial indicators, as a result, some of the reviewed studies stated that these two indicators had a positive effect and others indicated that these two indicators had no effect. It was also observed that the influence of these indicators was positive with increasing age, but the results were widespread at younger ages. It is suggested that a supplementary study on the effect of these factors in relation to each other be done in the future.

References

1-McTigue, D. J., Nowak, A. J., Fields, H. W., & Casamassiomo, P. S. (2013). Pediatric dentistry: infancy through adolescence. Missouri: Elsevier, 45.

[Downloaded from intjmi.com on 2026-09-06]

2- Dean, J. A. (Ed.). (2021). McDonald and Avery's dentistry for the child and adolescent-E-book. Elsevier Health Sciences.
3- Gussy, M. G., Waters, E. G., Walsh, O., & Kilpatrick, N. M. (2006). Early childhood caries: current evidence for aetiology and prevention. Journal of paediatrics and child health, 42(1-2), 37-43.
4- Lobstein, T., & Frelut, M. L. (2003). Prevalence of overweight among children in Europe. Obesity reviews, 4(4), 195-200.
5- Hedley, A. A., Ogden, C. L., Johnson, C. L., Carroll, M. D., Curtin, L. R., & Flegal, K. M. (2004). Prevalence of overweight and obesity among US children, adolescents, and adults, 1999-2002. Jama, 291(23), 2847-2850.
6- Meamar, N., Ghazizadeh, A., & Mahmoodi, S. (2000). DMFT (decayed, missing and filled teeth) Index and Related Factors in 12-year-old School Children in Sanandaj. Scientific Journal of Kurdistan University of Medical Sciences, 5(1), 30-36.
7- Wake, M., Nicholson, J. M., Hardy, P., & Smith, K. (2007). Preschooler obesity and parenting styles of mothers and fathers: Australian national population study. Pediatrics, 120(6), e1520-e1527.
8- Shivakumar S, Srivastava A, C Shivakumar G. Body mass index and dental caries: A systematic review. Int J Clin Pediatr Dent. 2018; 11(3): 228-32.
9- Swaminathan K, Anandan V, SelvaKumar H, Thomas E. Correlation between body mass index and dental caries among three- to 12-year-old schoolchildren in India: A cross-sectional study. Cureus 2019; 11(8): e5421.
10- Bahrololoomi Z, Soruri M, Kabodan M, Ravaei S. The relationship between BMI and DMFT/dmft among 7-11 year-old children in Yazd. J Shahid Sadoughi Univ Med Sci 2014; 21(6): 751-8.
11- H. Elkhodary, D. Farsi, L. Merdad et al., "Prevalence of obesity among preschool children and its relation with dental caries," Journal of Dentistry and Oral Hygiene, vol. 9, no. 1, pp. 1–7, 2017.
12. L. S. Bafti, M. A. Hashemipour, H. Poureslami, and Z. Hoseinian, "Relationship between body mass index and tooth decay in a population of 3-6-year-old children in Iran," International Journal of Dentistry, vol. 2015, Article ID 126530, 5 pages, 2015.
13- J. Liang, Z. Zhang, Y. Chen et al., "Dental caries is negatively correlated with body mass index among 7-9 years old children in Guangzhou, China," BMC Public Health, vol. 16, no. 1, p. 638, 2016.
14- L.-W. Li, H. M. Wong, and C. P. McGrath, "Longitudinal association between obesity and dental caries in adolescents," Journal of Pediatrics, vol. 189, pp. 149–154, 2017.
15- G. Qadri, M. Alkilzy, Y.-S. Feng, and C. Splieth, "Overweight and dental caries: the association among German children," International Journal of Paediatric Dentistry, vol. 25, no. 3, pp. 174–182, 2015.
16- S. Basha, R. N. Mohamed, H. S. Swamy, P. H. Ramamurthy, and V. Sexena, "Caries incidence among obese adolescents: a 3-year prospective study," Oral Health & Preventive Dentistry., vol. 15, no. 1, pp. 65–71, 2017.
18- Talebi, M., Saraf Shirazi, A., & Esmaili, H. (2005). The relationship between diet and oral hygiene and gingival status in private preschool children in the city of Mashhad. Journal of Mashhad dental school, 29(Issue), 223-134. 19. O'Sullivan, E. A., & Curzon, M. E. (2000). A comparison of acidic dietary factors in children with and without dental erosion. ASDC journal of dentistry for children, 67(3), 186-92.
19. Harris, R., Nicoll, A. D., Adair, P. M., & Pine, C. M. (2004). Risk factors for dental caries in young children: a systematic review of the literature. Community dental health, 21(1), 71-85.
20. A. Sheiham, "Dental caries affects body weight, growth and quality of life in pre-school children," British Dental Journal, vol. 201, no. 10, pp. 625-626, 2006.
21. M. A. A. E. Qomsan, M. N. Alasqah, F. A.

[Downloaded from intjmi.com on 2026-09-06]

Alqahtani, M. A. Alobaydaa, M. M. Alharbi, and Z. Kola, "Intricate evaluation of association between dental caries and obesity among the children in Al-Kharj city (Saudi Arabia)," Journal of Contemporary Dental Practice, vol. 18, no. 1, pp. 29–33, 2017.

22- T. Lobstein, R. Jackson-Leach, M. L. Moodie et al., "Child and adolescent obesity: part of a bigger picture," The Lancet, vol. 385, no. 9986, pp. 2510–2520, 2015.

23- Raheleh Soltani, Gholamreza Sharifirad, Akbar Hasanzadeh, Parasto Golshiri, Maryam Barati. Mothers' Knowledge and Attitude on Oral Health Preschool Children in Isfahan, Iran. HSR 2013; 9 (7) :712-719

24- Rosenblatt, A., & Zarzar, P. (2004). Breast-feeding and early childhood caries: an assessment among Brazilian infants. International Journal of Paediatric Dentistry, 14(6), 439-445.

25- Azevedo, T. D. P. L., Bezerra, A. C. B., & de Toledo, O. A. (2005). Feeding habits and severe early childhood caries in Brazilian preschool children. Pediatric dentistry, 27(1), 28-33.

26- Reifsnider, E., Mobley, C., & Mendez, D. B. (2004). Childhood obesity and early childhood caries in a WIC population. Journal of Multicultural Nursing & Health, 10(2), 24.

27- Willershausen, B., Haas, G., Krummenauer, F., & Hohenfellner, K. (2004). Relationship between high weight and caries frequency in German elementary school children. European journal of medical research, 9, 400-404.

28- Willerhausen, B., Blettner, M., Kasaj, A., & Hohenfellner, K. (2007). Association between body mass index and dental health in 1,290 children of elementary schools in a German city. Clinical oral investigations, 11(3), 195-200.

29- Tuomi, T. (1989). Pilot study on obesity in caries prediction. Community dentistry and oral epidemiology, 17(6), 289-291.

30- Chen, W., Chen, P., Chen, S. C., Shih, W. T., & Hu, H. C. (1998). Lack of association between obesity and dental caries in three-year-old children. Zhonghua Minguo xiao er ke yi xue hui za zhi [Journal]. Zhonghua Minguo xiao er ke yi xue hui, 39(2), 109-111.

31- Hong, L., Ahmed, A., McCunniff, M., Overman, P., & Mathew, M. (2008). Obesity and dental caries in children aged 2-6 years in the United States: National health and nutrition examination survey 1999-2002. Journal of public health dentistry, 68(4), 227-233.

32- Granville-Garcia, A. F., Menezes, V. A. D., Lira, P. I. D., Ferreira, J. M., & Leite-Cavalcanti, A. (2008). Obesity and dental caries among preschool children in Brazil. Revista de Salud Pública, 10, 788-795.

33- Hooley M, Skouteris H, Boganin C, Satur J, Kilpatrick N. Body mass index and dental caries in children and adolescents: A systematic review of literature published 2004 to 2011. Syst Rev 2012;1:57.

34- Talebi M, Saraf A, Esmaili H. The relationship between diet and oral hygiene and gingival status in private preschool children in the city of Mashhad. Journal of dentistry Mashhad university of medical sciences 2006;29:223-234

[Downloaded from intjmi.com on 2026-09-06]