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Original Article

Influential Factors on the Prevalence of Childhood Obesity and Overweight in Jiroft, Kerman Province, Iran

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Abstract

Background: We aimed to investigate the factors that influence the prevalence of obesity and overweight in children in Jiroft, Kerman Province, Iran using tree regression analysis.

Methods: A cross-sectional study was conducted in 2024. Children aged 2-6 years were selected from the kindergartens of Jiroft City by a stratified random sampling method. Parents' demographic information, the mother's health information during pregnancy, nutrition, and the child's lifestyle were obtained through a questionnaire. Children's BMI Z-score was measured. A decision tree model was built using the "rpart" package in R software (version 4.5.1).

Results: Out of 1032 children aged 2-6 years, 51.0% (n=522) were girls. The factors affecting the BMI of children include having a father weighing more than 89 kg, a high-income family, and a birth weight of less than 3.1 kg. According to the regression model, mother's job (*P*-value=0.045), father's weight (*P*-value=0.002), and birth weight (*P*-value=0.013) were positively associated with higher child's BMI status. In contrast, daily vegetable intake (*P*-value=0.044) was negatively associated with current BMI.

Conclusion: Fathers' weight, family income, and vegetable intake are key factors influencing early childhood BMI in Jiroft. Targeted interventions should prioritize engaging fathers in weight management programs before and during their child's formative years. Obesity prevention efforts must also address lifestyle behaviors in affluent households through tailored nutritional counseling. Regular vegetable intake appears to have a protective effect, contributing to lower BMI in children.

Keywords: Children; Obesity; Overweight; Iran

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Introduction

The prevalence of overweight and obesity among children is rising rapidly on a global scale (1). In the United States, around 15% of children under the age of five are considered obese, while in Europe, obesity rates for children aged 2-6vary between 3.5% and 7.3% (2). Like many other countries, Iran is also facing the issue of child obesity (3), with around 8% of children under the age of 5 being impacted by this condition (4). Increasing child obesity has a wide range of negative outcomes. Also, it is affected by multiple environmental factors such as conditions of preconception and prenatal, as well as broader changes in consumable food and physical activity (5).

Childhood obesity is associated with an increased risk of obesity in adulthood and some negative outcomes (6). It is considered one of the most significant risk factors for cardiovascular and metabolic diseases (7). Additionally, obesity in children impacts not only their physical health but also their mental health. Children who are obese are more prone to face social stigma, experience low self-esteem, and develop mental health issues (8). The frequency of childhood obesity appears to be shifting from developed countries to developing nations, which are often less equipped to manage the future health complications that arise from obesity (9). Consequently, early childhood is a crucial period for establishing healthy patterns, and rapid weight gain during this period underscores the importance of early intervention (10).

Various factors, such as income and education levels, distinctions between urban and rural lifestyles, levels of physical activity, and prenatal influences, contribute to the prevalence of obesity and overweight among children (11). The prevalence of obesity among children varies depending on whether they live in rural or urban areas, as well as their geographical location (12). In Iran, there are notable regional differences in obesity rates; for instance, Mashhad has reported rates as high as 66.5%, while Ahwaz has rates as low as 3.6% (13). Research suggests that the timing of obesity treatment significantly affects long-term outcomes, with earlier interventions associated with better results (2).

National evidence demonstrates that parental weight has consistently emerged as a dominant determinant of child BMI. Children with overweight or obese parents had more than twice the odds of obesity (14). In addition, a global study confirms that parental obesity substantially increases the risk of childhood obesity through shared genetic and environmental pathways (15). Moreover, research in Iranian provinces found both low and high income associated with obesity risk (16). Socioeconomic status has been linked to childhood overweight patterns through parental occupation and education levels (17). While a study reported that higher vegetable and fruit consumption reduces obesity risk (18), another study observed no protective effect or even a positive relationship under certain dietary contexts (19). These inconsistencies justify further exploration of localized eating behaviors in different Iranian regions.

In general, it is always recommended to use models that handle more complexity and detail of the data (20). Simple linear regression results are presented with the assumption that there is a linear relationship between the variables and are not capable of nonlinear relationships. In this study, we used tree models in addition to linear regression to examine relationships in more detail (regardless of whether they are linear or nonlinear). Decision tree-based models are particularly well-suited to automatically detect nonlinear thresholds and multi-way interactions without the need for pre-determination, thus providing a data-driven approach to uncovering complex decision boundaries that standard linear regression cannot adequately capture (21).

We aimed to explore the factors that influence the rates of obesity and overweight among children in Jiroft using tree regression and classical statistical methods.

Methods

Study population and Sampling

A cross-sectional study was conducted in 2024 in Jiroft City, Kerman, Iran. A total of 1,032 children aged 2-6 years were selected from kindergartens using a stratified random sampling method. In the first stage, all kindergartens in Jiroft City were categorized into strata based on their geographical location (northern, central, and southern districts) and type (boys' or girls' kindergartens) to ensure equal representation across different areas of the city. Within each stratum, kindergartens were randomly selected proportionate to the total number of schools in that category; in total, 100 kindergartens (50 kindergartens for boys and 50 kindergartens for girls) were included. In the second stage, 10 children were randomly selected from the enrollment list of each kindergarten using a simple random procedure. Inclusion criteria included an age range of 2–6 years and at least one year of residence in Jiroft City, while children with chronic diseases were excluded from the study.

Sample Size Estimation

To calculate the sample size, the appropriate sample size formula for multiple linear regression was used by the G-Power3.1.9.2 software. With a type I error of 0.05, a power of 0.90, and an effect size of f^2=0.03, as well as 30 predictor variables, a sample size of 1032 was calculated. We also need a large sample size to use decision theory methods (22).

Data collection forms

In the data collection form, the information related to the parents included the demographic information of the child's parents (age, education, income, occupation, smoking), cardiovascular disease, diabetes, medication use, and the mother's health during pregnancy was obtained. Also, the information about parents' height and weight was obtained by self-report.

Information about child nutrition was also obtained through a data collection form, which included information about child nutrition during infancy, including the type of milk consumed (breast milk or formula), and until what age the child consumed milk. Information related to the nutrition of children aged 2-6 years, including consumption of fruit, vegetables, fast food, unhealthy snacks, high salt consumption, and type of oil consumed (solid, liquid, and animal oil), was received on a weekly or daily basis. Information about the child's lifestyle, including watching TV, using mobile phones, the amount of physical activity, and getting sick, was obtained.

Statistical Analysis

To examine the relationship between children's and their parents' variables with obesity status, ANOVA and Chi-square tests were used. Then, a linear regression model was used to examine the relationship between factors and body mass index status. Finally, a decision tree model was built using the "rpart" package in R software (version 4.5.1). The significance level in all tests is considered to be 0.05.

Results

Of the total 1032 children aged 2-6years, 51.0% (n=522) were girls and 49.0%(n=510) were boys. Table 1 shows the variables related to the parents of children by BMI status. The average weight of mothers of children with normal BMI status was 65.46, which is lower than that of others (*P*-value=0.011). The average weight of fathers of obese children was 83.91, and that of overweight children was 88.72, which is higher than that of other groups (*P*-value<0.001).

Table 1: Characteristics of parents based on their children's weight

Variables	Underweight	Normal	Overweight	Obesity	ANOVA-test	
	Mean±SD				F	*P*-value*
Father age (yr)	37.58±5.49	37.93±6.22	37.96±6.26	38.74±6.48	0.40	0.760
Mother age (yr)	33.88±5.41	33.49±6.15	33.33±6.03	24.68±6.01	0.82	0.480
Mother weight (kg)	63.98±9.41	65.46±10.48	68.78±11.65	67.63±12.15	3.76	0.011*
Father weight (kg)	77.32±12.21	77.31±11.36	80.72±12.99	83.91±15.57	7.15	<0.001*
Mother height (cm)	160.40±6.48	161.40±6.68	161.89±7.76	161.51±5.89	0.48	0.699
Father height (cm)	172.98±19.81	172.62±12.03	172.72±15.19	174.15±10.6	0.24	0.867
Income						
Low	8(4.6)	151(86.8)	9(5.2)	6(3.4)	17.58	0.007*
Medium	21(5.1)	322(87.9)	42(10.3)	23(5.6)		
High	5(3.6)	99(71.2)	19(13.7)	16(11.5)		
Father Job						
Employee	18(4.6)	298(76.2)	42(10.7)	33(8.4)	6.87	0.086
Housekeeper	32(5.1)	507(80.7)	60(9.6)	29(4.6)		
Mother Job						
Employee	37(4.6)	637(79.1)	80(9.9)	51(6.3)	1.57	0.670
Housekeeper	10(5.1)	158(80.2)	21(10.7)	8(4.1)		
Mother Education						
Elementary	3(5.3)	48(84.2)	4(7.0)	2(3.5)	1.04	0.750
Highschool	48(5.0)	795(78.7)	98(10.2)	60(6.2)		
Father Education						
Elementary	8(6.2)	105(80.8)	11(8.5)	6(4.6)	1.40	0.701
Highschool	42(4.7)	697(78.7)	92(10.4)	55(6.2)		
Mother Heart-Disease						
Yes	1(2.8)	24(66.7)	6(16.7)	5(13.9)	6.39	0.940
No	49(5.1)	765 (79.3)	95(9.8)	56(5.8)		
Mother Diabetes						
Yes	1(2.8)	27(75.0)	4(11.1)	4(11.1)	2.03	0.566
No	48(5.0)	765(79.4)	94(9.8)	57(5.9)		
Mother Smoking						
Yes	1(12.5)	4(50.0)	2(25)	1(12.5)	4.13	0.248
No	48(4.8)	797(79.1)	101(10)	61(6.1)		
Gestational Mother-Smoking						
Yes	0(0)	4(66.7)	2(33.3)	0(0)	3.95	0.276
No	50(5.0)	791(78.8)	101(10.1)	62(6.2)		
Father Heart-Disease						
Yes	1(3.4)	17(58.6)	8(27.6)	3(10.3)	11.58	0.009*
No	48(4.9)	771(79.5)	93(9.6)	58(6.0)		
Father Diabetes						
Yes	0(0)	21(80.8)	3(11.5)	2(7.7)	1.52	0.677
No	50(5.1)	769(78.8)	99(10.1)	58(5.9)		
Father Smoking						
Yes	5(4.7)	19(85.0)	8(7.5)	3(2.8)	3.56	0.313
No	43(4.7)	709(78.3)	95(10.5)	59(6.5)		

Table 2 shows the variables related to children by BMI status. The birth height of children had a significant correlation with their current BMI status (*P*-value<0.001). Regarding other variables, no significant relationship was observed between children's variables and BMI status (*P*-value>0.05).

Table 2: Investigating the relationship between children's variables and BMI status

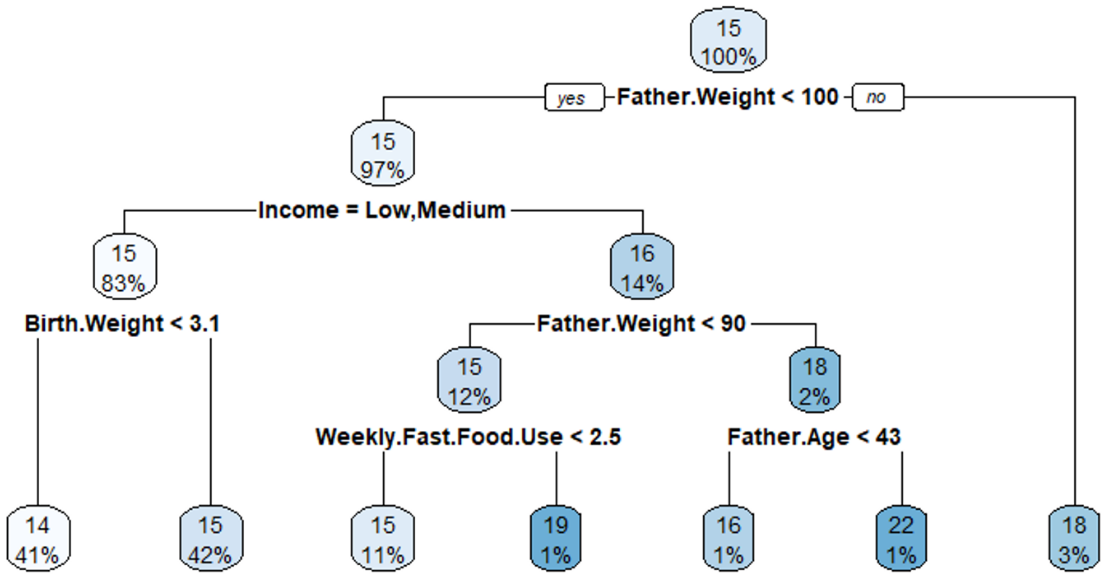
Variables	Underweight	Normal	Overweight	Obesity	ANOVA-test	
	Mean±SD				F	*P*-value*
Birth-Weight	2.94±0.57	3.05±0.52	3.17±0.51	2.94±0.57	7.13	0.068
Height-Birth	48.30±7.53	48.82±6.73	49.39±5.43	48.59±5.36	188.8	<0.001*
Breast Milk-Months	16.56±9.07	18.10±6.75	18.21±7.27	18.03±7.78	1.94	0.585
Fruit-Daily	2.14±1.41	2.29±1.11	2.17±0.95	2.02±0.83	0.75	0.860
Vegetables-Daily	2.92±1.95	2.81±1.74	2.82±1.78	3.14±1.85	1.49	0.216
Fast-Food-Weekly	1.50±0.64	1.50±0.74	1.48±0.67	1.72±0.77	1.30	0.273
Physical activity						
Yes	6(6.6)	66(72.5)	11(12.1)	8(8.8)	2.70	0.441
No	43(4.7)	732(79.6)	91(9.9)	54(5.9)		
Gestation-BP						
Yes	4(3.4)	92(78.6)	14(12)	7(6.0)	14.05	0.003*
No	46(5.3)	694(79.3)	83(9.5)	59(5.9)		
Gestation-Heart-Disease						
Yes	2(8.7)	18(78.3)	3(13)	0(0)	1.35	0.720
No	48(4.9)	769(79.1)	96(9.9)	59(6.1)		
Gestational-Diabetes						
Yes	3(3.1)	67(68.4)	16(16.3)	12(12.2)	1.42	0.702
No	47(5.3)	717(80.2)	83(9.3)	47(5.3)		
Child's Disease						
Yes	4(8.9)	36(80.0)	3(6.7)	2(4.4)	2.26	0.521
No	47(4.8)	775(79.0)	99(10.1)	60(6.1)		
Using-Milk-Powder						
Yes	16(4.6)	272(78.8)	36(10.4)	21(6.1)	2.17	0.539
No	34(5.1)	530(79.0)	67(10.0)	40(6.0)		
Using-Breast-Milk						
Yes	45(4.9)	735(79.3)	93(10)	54(5.8)	0.14	0.987
No	6(7.6)	61(77.2)	6(7.6)	6(7.6)		
Daily-Intake-Fruit						
Yes	49(5)	765(78.8)	99(10.2)	58(6)	7.54	0.582
No	2(3.8)	43(81.1)	4(7.5)	4(7.5)		
Daily-Intake-Vegetables						
Yes	30(5)	469(77.9)	65(10.8)	38(6.3)	1.24	0.742
No	21(5.1)	332(80.4)	37(9.0)	23(5.6)		
Extra-Salt						
Yes	5(4.0)	101(80.2)	4(11.1)	6(4.8)	0.82	0.844
No	45(5.1)	694(78.6)	89(10.1)	55(6.2)		
Using-Junk-Food						
Daily	10(5.0)	158(79.0)	18(9.0)	4(7.0)	0.63	0.888
Weekly	38(5.2)	577(78.6)	76(10.4)	43(5.9)		
Playing-With-Mobile						
Yes	3(4.6)	530(78.3)	4(10.9)	42(6.2)	2.17	0.538
No	19(5.7)	267(80.2)	28(8.4)	19(5.7)		

Table 3 presents the investigation of the correlation between demographic Factors and BMI status. First, the multicollinearity of the factors was checked, and the VIF value for all independent variables was less than 5. According to the regression model, mother's job (*P*-value=0.045), father's weight (*P*-value=0.002), and birth weight (*P*-value=0.013) were positively associated with higher child's body mass index status. Conversely, daily intake of vegetables (*P*-value=0.044) was negatively correlated with BMI, indicating that regular vegetable consumption is linked to a lower BMI in children.

Table 3: Investigating the correlation between demographic Factors and BMI status

Parameter	B	S.E	GLM	
			Wald	*P*-value*
(Intercept)	12.33	2.97	17.18	0.001*
Mother Job-[Employee]	0.41	0.20	3.23	0.045*
Father Job-[Employee]	0.08	0.27	0.08	0.785
Mother-Education-[Elementary/High School]	-0.17	0.52	-0.10	0.751
Father-Education-[Elementary/High School]	0.17	0.35	0.23	0.630
Mother Heart Disease-[Yes]	0.74	0.56	1.71	0.191
Mother-Diabetes-[Yes]	0.41	0.61	0.46	0.497
Mother-Smoking-[Yes]	-2.14	2.12	-1.01	0.315
Gestational-Mother-Smoking-[Yes]	1.08	2.13	0.25	0.613
Father-Heart-Disease-[Yes]	0.95	0.63	2.25	0.133
Father-Diabetes-[Yes]	0.12	0.60	0.04	0.835
Father-Smoking-[Yes]	-0.70	0.39	-3.10	0.078
Use-Breast-Milk-[Yes]	0.01	0.41	0.01	0.967
Daily-Intake-Fruit-[1]	-0.17	0.54	-0.10	0.748
Daily-Intake-Vegetables-[Yes]	-0.36	0.18	-3.25	0.044*
Use-Junk-Food-[Yes]	-0.05	0.26	-0.04	0.828
Play With Mobile-[Yes]	0.15	0.22	0.47	0.493
Sport-[Yes]	0.19	0.36	0.27	0.600
Use Milk-Powder-[Yes]	0.04	0.23	0.03	0.856
Family-Members	-0.04	0.18	-0.06	0.803
Father-Age	0.03	0.02	1.54	0.213
Mother-Age	-0.01	0.02	-0.19	0.657
Father-Weight	0.03	0.01	9.80	0.002*
Mother-Weight	0.00	0.01	0.58	0.444
Mother-Height	-0.01	0.01	-0.37	0.539
Father-Height	-0.01	0.01	-0.15	0.693
Birth-Weight	0.51	0.20	6.23	0.013*
Height-Birth	-0.00	0.01	-0.02	0.876
Rank-Birth	-0.16	0.20	-0.68	0.409
* GLM (Res=BMI) ~ All Factors				

According to the results in Fig. 1, factors affecting the BMI of children include having a father weighing more than 89 kg, a high-income family, and a birth weight of less than 3.1 kg. Also, having a father weighing less than 100 kg at the time of the child's birth also affected the BMI of children.



The "**anova**" method was used, and the **CP** value was set to **0.01**.

Fig. 1: Examining the importance of factors affecting children's BMI status

Discussion

The findings indicate that the weight status of parents has a significant impact on childhood overweight and obesity, consistent with another research (23, 24). Parents play a crucial role in shaping the home environment that influences their children's eating and physical activity behaviors. Their feeding practices play a vital role in shaping these eating habits. For example, parents often serve as 'gatekeepers' of their children's food environment, influencing the types of foods that are accessible and the organization of meals (25). Furthermore, the presence of healthy food options at home has a direct effect on children's dietary choices (26). This can be attributed to culturally specific dynamics in which fathers often serve as primary decision-makers regarding food choices, meal patterns, and lifestyle behaviors in the household, directly modeling eating habits and activity levels for their children.

We found that mothers' employment has a significant impact on childhood BMI, consistent with prior studies showing that working mothers may have less time for meal preparation and supervising children's activities, leading to poorer dietary habits and reduced physical activity (27). However, some research, such as Paramasivam et al. (28), reported that children of working mothers can also have lower BMI, reflecting complex and context-dependent effects.

In this study, a rise in monthly income was linked to elevated rates of childhood overweight and obesity. This finding contrasts with other research (29, 3), which suggests that children from low-income households face a greater risk of becoming overweight or obese. Increased monthly household income is positively correlated with lower BMI in children. Although there is a consistent negative relationship between family income and childhood obesity, the underlying causal mechanisms are not well understood. Gains in income do not automatically result in decreased obesity rates among children, suggesting that additional factors may influence this relationship (30). In the context of Jiroft, this can be explained by several factors unique to the region. Wealthier families often have increased access to high-calorie foods and electronic devices. Limited recreational facilities in the city encourage children from affluent households to engage in more sedentary indoor activities rather than play outdoors.

We identified a notable correlation between birth height and weight and the occurrence of obesity in children. This finding aligns with another research (31, 32). Indicating that shorter birth stature and higher birth weight may increase the likelihood of these children becoming overweight or obese in the future. Children who are born with shorter lengths may undergo compensatory growth after birth, potentially resulting in greater body weight as they age (33). Additionally, low birth height and high birth weight are linked to long-term health risks, such as obesity, metabolic syndrome, and cardiovascular diseases (34).

Our research indicates that maternal gestational hypertension is associated with an increased prevalence of childhood obesity, in alignment with the findings of the study by Kuciene et al. (35). Furthermore, a study revealed that although the link between maternal gestational hypertension and obesity in offspring may not be apparent during early childhood, it tends to strengthen as children age (36). The underlying mechanisms for this association may include the impact of maternal hypertensive disorders on placental function and nutrient delivery, which could result in unfavorable growth patterns in offspring, thereby increasing their risk of obesity and related metabolic disorders in the future (37).

Daily intake of vegetables was negatively associated with BMI, indicating that regular vegetable consumption is linked to lower BMI in children. consistent with other research, this finding indicates that poor eating habits are a primary contributor to childhood obesity. The researchers noted a rising trend in this issue, particularly among children (38). Liberali et al. demonstrate that the intake of fruits and vegetables plays a significant role in childhood obesity (39). This is supported by studies that have shown a correlation between higher fruit intake and healthier eating patterns, as well as reduced obesity rates in children (40).

In both models, the factors of the father's weight and newborn weight were influential factors in the children's body mass index. In addition to these factors, in the tree model, the factors of household income, father's age, and weekly use of fast food were also influential factors in the children's body mass index. Decision Tree complements the linear model by automatically detecting critical thresholds, complex interactions, and actionable rules, while the linear model identifies stable linear effects. In the regression model, the mother's occupation and vegetable consumption were also significant, which were not important factors in the tree model; however, household income served as a comprehensive proxy encompassing mother's occupation and vegetable consumption effects, with the Decision Tree providing clear intervention priorities. Also, in the tree model, only strong connections are initially seen, and weaker connections may be so-called masked (41).

Children whose fathers suffer from heart disease are at a higher risk of being overweight or obese. This correlation may be attributed to the shared family environment, which significantly influences children's dietary and physical activity habits. When fathers engage in unhealthy behaviors or maintain a sedentary lifestyle, their children are likely to mirror these habits, thereby increasing their obesity risk (42).

Limitation

This study was cross-sectional, and we should be careful when interpreting the results. Since the study relied on self-reports and responses from parents about their children's health, there could be mistakes in diagnosing conditions. We missed some children who do not attend kindergarten. Furthermore, no formal validity or reliability testing (such as expert content validation or pilot testing) was conducted for the data collection form.

Conclusion

The multifaceted nature of childhood obesity necessitates a comprehensive approach that considers various influencing factors, including parental weight, monthly income, vegetable intake, birth height, and maternal health during pregnancy. Engaging parents in healthy lifestyle practices and addressing disparities related to income are crucial for creating an environment that supports healthy weight maintenance in children.

Journalism Ethical Considerations

This study received ethical approval with the code IR.JMU.REC.1397.002 from the Ethics Committee of Jiroft University of Medical Sciences. The protocol underwent thorough evaluation to ensure compliance with ethical standards. Informed consent was obtained from all participants.

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Conflict of interest

The authors declared no conflict of interest.

References

1. Ribeiro AI, Santos AC, Vieira VM, et al (2020). Hotspots of childhood obesity in a large metropolitan area: does neighbourhood social and built environment play a part? *Int J Epidemiol*, 49(3):934-43.
2. Ek A, Brissman M, Nordin K, et al (2023). A long-term follow-up of treatment for young children with obesity: a randomized controlled trial. *Int J Obes (Lond)*, 47(11):1152-60.
3. Sanjari M, Amirkhosravi L, Hosseini SE, et al (2023). Underweight, overweight, obesity and associated factors among elementary school children: A cross-sectional study in Kerman province, Iran. *Obes Med*, 38:100477.
4. Khateri S, Moradi Y, Khazaei Z, et al (2019). Prevalence of obesity and overweight in Iranian children aged less than 5 years: a systematic review and meta-analysis. *Korean J Pediatr*, 62(6):206-212.
5. Lister NB, Baur LA, Felix JF, et al (2023). Child and adolescent obesity. *Nat Rev Dis Primers*, 9(1):24.
6. Danquah FI, Ansu-Mensah M, Bawontuo V, et al (2020). Risk factors and morbidities associated with childhood obesity in sub-Saharan Africa: a systematic scoping review. *BMC Nutr,* 6:37.
7. Taghizadeh S, Khodayari-Zarnaq R, Farhangi MA (2021). Childhood obesity prevention policies in Iran: a policy analysis of agenda-setting using Kingdon's multiple streams. *BMC Pediatr*, 21(1):250.
8. Hersch DE, Uy MJA, Ngaw SM, et al (2021). Primary care providers' perspectives on initiating childhood obesity conversations: a qualitative study. *Fam Pract,* 38(4):460-7.
9. González-Álvarez MA, Lázaro-Alquézar A, Simón-Fernández MB (2020). Global trends in child obesity: are figures converging? *Int J Environ Res Public Health,* 17(24):9252.
10. Frithioff-Bøjsøe C, Lund MAV, Lausten-Thomsen U, et al (2022). Early detection of childhood overweight and related complications in a Danish population-based cohort aged 2–8 years. *Obes Res Clin Pract*,16(3):228-34.
11. Alanazi SH, Abdollahian M, Tafakori L, et al (2024). Predicting age at onset of childhood obesity using regression, Random Forest, Decision Tree, and K-Nearest Neighbour—A case study in Saudi Arabia. *PloS one*,19(9):e0308408.
12. Crouch E, Abshire DA, Wirth MD, et al (2023). Rural-Urban Differences in Overweight and Obesity, Physical Activity, and Food Security Among Children and Adolescents. *Prev Chronic Dis,* 20:E92.
13. Akbari H, Mohammadi M (2022). The prevalence of obesity in Iranian children: a

systematic review and meta-analysis. *J Pediatr Rev*,10(2):93-102.
14. Doustmohammadian A, Abdollahi M, Bondarianzadeh D, et al (2012). Parental determinants of overweight and obesity in Iranian adolescents: a national study. *Iran J Pediatr,* 22(1):35-42.
15. Lee JS, Jin MH, Lee HJ (2022). Global relationship between parent and child obesity: a systematic review and meta-analysis. *Clin Exp Pediatr*,65(1):35-46.
16. Salari-Moghaddam A, Hajihashemi *P*, Basirat R, et al (2019). Household socioeconomic status in relation to childhood general and central obesity in Farrokhshahr, Iran. *ARYA Atheroscler,* 15(5):211-7.
17. Zhang Y, Mei H, Xu K, et al (2021). Association and potential mediators between socioeconomic status and childhood overweight/obesity. *Prev Med*,146:106451.
18. Nouri M, Shateri Z, Faghih S (2023). The relationship between intake of fruits, vegetables and dairy products with overweight and obesity in a large sample in Iran: Findings of STEPS 2016. *Front Nutr*, 9:1082976.
19. Bahreynian M, Paknahad Z, Maracy MR (2013). Major dietary patterns and their associations with overweight and obesity among Iranian children. *Int J Prev Med*, 4(4):448-58.
20. Bahrampour A, Baneshi MR, Karamoozian A, Seyedghasemi NS, Etminan A, Eghbalian M (2024). Long-Term Survival of Patient with End-Stage Renal Disease Using Bayesian Mixture Cure Rate Frailty Models. *Iran J Public Health*, 53(9):2113-20.
21. Eghbalian M, Akbari H, Norozi M, et al (2025). Correlation between Obesity and Risk Factors of Cardiovascular Diseases in Military Personnel. *Iran J Public Health*, 54(1):205-213.
22. Silvey S, Liu J (2024). Sample Size Requirements for Popular Classification Algorithms in Tabular Clinical Data: Empirical Study. *J Med Internet Res*, 26:e60231.
23. Fan H, Zhang X (20222). Influence of parental weight change on the incidence of overweight and obesity in offspring. *BMC Pediatr*, 22(1):330.
24. Mei H, Guo S, Lu H, et al (2018). Impact of parental weight status on children's body mass index in early life: evidence from a Chinese cohort. *BMJ Open,* 8(6):e018755.
25. Kininmonth AR, Herle M, Tommerup K, et al (2023). Parental feeding practices as a response to child appetitive traits in toddlerhood and early childhood: a discordant twin analysis of the Gemini cohort. *Int J Behav Nutr Phys Act*, 20(1):39.
26. Gomes AI, Pereira AI, Roberto MS, et al (2021). Changing parental feeding practices through web-based interventions: A systematic review and meta-analysis. *PLoS One*, 16(4):e0250231.
27. Zhuang CC, Jones-Smith JC, Andrea SB, et al (2023). Maternal precarious employment and child overweight/obesity in the United States. *Prev Med*, 169:107471.
28. Paramasivam K, Manjunathappa TH, SampathKumar B,et al (2025). Employability of Mothers and its Impact on Body Mass Index and Dental Caries of their Preschool Children: A Cross-sectional Study. *Int J Clin Pediatr Dent,* 18(1):91-9.
29. Hsu P-C, Hwang F-M, Chien M-I, et al (2022). The impact of maternal influences on childhood obesity. *Sci Rep,*12(1):6258.
30. Martin MA (2021). What is the causal effect of income gains on youth obesity? Leveraging the economic boom created by the Marcellus Shale development. *Soc Sci Med,* 272:113732.
31. Baran J, Weres A, Czenczek-Lewandowska E, et al (2019). Relationship between children's birth weight and birth length and a risk of overweight and obesity in 4–15-year-old children. *Medicina,* 55(8):487.
32. Lin Y, Rankin R, McDonald S, et al (2025). Children's birth weight and the risk of general obesity and central obesity in primary school children: a 4-year longitudinal study. *Front Public Health,*13:1469226.
33. Putri RR, Danielsson P, Marcus C, et al (2024). Height and growth velocity in children and adolescents undergoing obesity treatment: a prospective cohort study. *J Clin Endocrinol Metab*, 109(1):e314-e20.
34. Andriani H (2021). Birth weight and childhood obesity: effect modification by residence and household wealth. *Emerg Themes Epidemiol*, 18(1):6.
35. Kuciene R, Dulskiene V (2022). Associations of maternal gestational hypertension with high blood pressure and overweight/obesity in

their adolescent offspring: a retrospective cohort study. *Sci Rep,* 12(1):3800.
36. Yan S, Lyu J, Liu Z, et al (2022). Association of gestational hypertension and preeclampsia with offspring adiposity: A systematic review and meta-analysis. *Front Endocrinol,*13:906781.
37. Chen Y, Wang Y, Li Y, et al (2023). Association of the Severity of Hypertensive Disorders in Pregnancy with Birthweight, Childhood Obesity, and Blood Pressure at Age 7. *Nutrients,*15(14):3104.
38. Mustafa AEM, Assery AAA, Asiri FMA, et al (2021). Childhood obesity and its relation with dietary habits among children in Aseer region, Southern Saudi Arabia. *J Family Med Prim Care* 10(10):3760-4.
39. Liberali R, Kupek E, Assis MAAd (2020). Dietary patterns and childhood obesity risk: a systematic review. *Child Obes,*16(2):70-85.
40. Tambalis KD, Panagiotakos DB, Sidossis LS (2024). Increased fruit consumption was favorably associated with dietary habits, obesity, sedentary time, and physical fitness among Greek children and adolescents. *J Public Health Emerg*, 2(3):8.
41. Breiman L (2017). *Classification and regression trees*. Chapman and Hall/CRC.
42. Nielsen LA, Nielsen TRH, Holm J-C (2015). The impact of familial predisposition to obesity and cardiovascular disease on childhood obesity. *Obes Facts*, 8(5):319-28.