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Prevalence of Overweight, Obesity, and Its Related Factors in Adult Population of Yazd

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ABSTRACT

Background: Obesity is considered as the greatest cause of chronic diseases worldwide. The prevalence rate of obesity and overweight should be recognized in the community for planning and prioritizing health problems. The aim of this study was to investigate the prevalence of obesity and overweight and its related factors among residents of Yazd city, Iran. **Methods:** This cross-sectional study was conducted among 790 participants aged 20-70 years. Participants were selected through multi-stage systematic sampling in 2018. The individuals' demographic data, and anthropometric measurements such as height and weight were measured. Data were analyzed by descriptive statistics, chi-square, and correlation coefficients. **Results:** The mean age of participants was 45.10 ± 14.56 years. According to the results, 170 (21.51%) and 280 (35.44%) participants were obese and overweight, respectively. Overweight was also associated with demographic variables of mobility, age, and income. Furthermore, a significant relationship was found between weight status and demographic variables of mobility, age, and income. Based on the results, a significant and positive correlation was observed between body mass index and age (R = 0.75, *P* = 0.03). **Conclusion:** Obesity and overweight is a major public health problem in Yazd, especially among women, older age, and low-income groups in Yazd. Therefore, appropriate plans should be designed to reduce this health problem.

Keywords: *Prevalence; Obesity; Overweight; Yazd*

Introduction

Considering the transition from traditional to modern lifestyles in most countries around the world- especially Iran- lifestyle-related illnesses are on the rise such as lung cancer, diabetes, high

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blood pressure, as well as overweight and obesity (Skinner *et al.*, 2018). Obesity and overweight are among the factors affecting human health, which has become one of the most worrying issues in societies. Obesity is the biggest cause of chronic diseases worldwide. Diabetes, hypertension, hyperlipidemia, cardiovascular diseases, sleep apnea, gallbladder disease, some cancers, and a group of mental illnesses are associated with obesity (Monfared A *et al.*, 2017). Weight gain is the result of imbalance between energy intake and energy consumption (Daepp *et al.*, 2019). In recent decades, people's lifestyles have reduced energy consumption, but increased calorie intake (Haire- Joshu *et al.*, 2019). Body mass index (BMI) is one of the most well-known criteria for measuring the risk of obesity and overweight (Karimi, 2017). According to World Health Organization statistics, the prevalence of obesity is higher than that of hunger. In other words, 800 million people have insufficient food in the world and nearly 2 billion are overweight; among them 650 million are obese (Hales *et al.*, 2018). In Iran, 29 million people are obese and overweight. In 1980, 2 million people were obese in Iran, which increased by 5.5 times (11 million people) in 2018. The number of overweight people in Iran increased from 5 million to 18 million (more than 3.5 times) over the same period. Iran is ranked 41 in terms of obesity in the world. Obesity and its related complications are the cause of 17% of deaths in Iran (GO, 2017). Yazd is ranked fifth in Iran in terms of sedentary life style. Over the past 10 years, the obesity growth rate was 55% in Yazd (Mirzaei *et al.*, 2017b). Numerous factors including environmental factors, diseases, genetics, drugs, lifestyle, high consumption of fast food, and inactivity can influence body weight (Aguilera *et al.*, 2019). One of the most important factors affecting energy consumption and body weight regulation is physical activity. Physical activity includes activities based on human strength such as exercising, running, walking, and cycling (Jayasekara *et al.*, 2018). Lack of physical activity results in sedentary lifestyle, which is a problem of the present era (Haegele *et al.*, 2019). Decreased physical activity and sedentary lifestyle habits are consequences of aging, urbanization, sedentary jobs, etc. (Benusic and Cheskin, 2019). Different studies were conducted on the relationship between physical activity and weight status with socioeconomic status of individuals including age, mobility, education, occupation, income, etc. (Adetunji *et al.*, 2019, Karimi, 2017, Monfared A *et al.*, 2017, Rozita *et al.*, 2019). Most studies reported that individuals' physical health and weight status are affected by socioeconomic status. In studies that examined education, occupation, income, and employment status simultaneously, education and occupation were the strongest determinants of socioeconomic status. In most cases, people's dietary intakes depend on these two factors (Ramezankhani A *et al.*, 2013).

The prevalence rate of obesity and overweight should be determined in the community for planning and prioritizing health problems. The prevalence of overweight and obesity is high in Yazd city. Furthermore, overweight and obesity have a relationship with cardiovascular risk factors, diabetes, and other chronic diseases. So, the aim of the present study was to investigate the relationship between weight status indices and demographic factors of age, gender, education level, job and income, marital status, and mobility among adult residents of Yazd city, Iran.

Materials and Methods

Study design, participants: This cross-sectional study was conducted among 790 residents aged 20-70 years in Yazd, Iran. The participants were selected by multi-stage systematic sampling in 2018. Sample size was estimated as 790 based on a 50-percent prevalence hypothesis according to the statistical formula of 5 percent error and test power of 20 %. Sampling was done systematically in two stages. In the first phase, two neighborhoods were randomly selected from each five economic classes (according to Yazd's Housing and Urban Development Division) and then random sampling was carried out in each of these neighborhoods. A

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total of 10 neighborhoods were selected from 50 neighborhoods in Yazd. Participants were selected according to the size of population in each economic class and each neighborhood. In order to increase the accuracy of comparison in different age groups and between both genders, systematic sampling was carried out from each neighborhood. In this way, an equal number of people was selected from each age group (20-30, 30-40, 40-50, 50-60, and 60-70) and both genders.

Inclusion criteria were having age of 20-70 years, living in the neighborhood for at least the last 3 years, having no physical and mental disabilities and visual impairments, having no previous history of stroke, and signing the informed consent form to participate in the study.

The data were collected by three questioners from October to December 2018. About 20 minutes was allocated for each person to measure anthropometric indices and complete the questionnaires. After selecting the participants, individuals were provided with explanations about the research process and goals. People were ensured about confidentiality of the information. Participants were also required to sign the informed consent forms.

Measurements: Anthropometric assessment was performed according to the legal guidelines. Body mass index (BMI) 25-30 and above 30 kg/m^2 were considered as overweight and obese, respectively. The participants' height was measured using a height-measuring device (Seca) with an accuracy of 0.5 cm and their weight was measured by the Omron scale to the precision of 100 g. Demographic checklists (including age, gender, income adequacy, education, occupation, marital status, and mobility status) were completed for all participants.

Data analysis: Data were analyzed using descriptive (frequency, percentage), analytical statistics (chi-square test), and Pearson correlation analyses. Statistical analysis was carried out using SPSS 24. P-values < 0.05 were considered as statistically significant.

Ethical considerations: This manuscript was derived from a Master's thesis of Human Ecology approved by Ethics Committee, Yazd Shahid Sadoughi University of Medical Sciences with the ethics code of IR.SSU.SPH.REC.1397.081. All participants signed written informed consent forms to enter the study.

Results

In this research, 790 residents of Yazd city were studied. The mean age of participants was 45.10 ± 14.56 years, 395 (50%) were males, and 395 (50%) were females. In each ten-year age group, 158 (20%) people participated. Considering the level of education, 174 participants (22.02%) had high school degree. In terms of marital status, 479 (60.63%) were married. Our findings indicated that 321 (40.63%) individuals were unemployed or homeless, 364 (46.07%) considered their income to be sufficient to meet their living needs, and 290 people (36.70%) were in average level of mobility (**Table 1**).

In this study, 170 participants (21.51%) were obese and 280 (35.44%) were overweight. **Table 2** shows distribution of the study population in terms of obesity and overweight.

The prevalence of overweight in women and men were 206 (26.07%) and 74 (9.36%), respectively. The prevalence of obesity in women and men was 125 (15.82%) and 45 (5.69%), respectively. The prevalence of overweight and obesity increased with increase of age, so that the lowest prevalence of obesity was observed in 20-30 year-old participants with a frequency of 4. The highest prevalence of obesity was reported in women with a frequency of 125. According to the Chi-square test, the relationship between weight status and demographic variables age ($P < 0.001$), gender ($P < 0.001$), job ($P < 0.001$), income sufficiency ($P = 0.03$), and mobility status ($P < 0.001$) was statistically significant (**Table 3**).

According to the Pearson correlation coefficient, a significant positive correlation was found between BMI and age ($R = 0.75$, $P = 0.03$).

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Table 1. Frequency distribution of demographic information of participants

Variables	Number	Percent
Age (year)		
20-30	158	20
30-40	158	20
40-50	158	20
50-60	158	20
60-70	158	20
Gender		
Male	395	50
Female	395	50
Educational level		
Illiterate	37	4.68
Elementary grade	103	13.03
Secondary grade	141	17.84
High School and Diploma	174	22.02
Associate Degree	169	21.39
Bachelor	82	10.37
Masters' degree and higher	84	10.63
Marital status		
Single	213	26.96
Married	479	60.63
Divorced or widowed	98	12.40
Job		
Student	51	6.45
Employee	145	18.35
Self-employed	223	28.22
Unemployed or housewife	321	40.63
Retired	50	6.32
Income adequacy	291	36.83
Yes	364	46.07
Somewhat	135	17.08
No		
Mobility status	282	35.69
Inactive	290	36.70
Middle	2018	27.59
Much		

Table 2. Distribution of obesity and overweight in the participants

Variables	N	%
Normal weight	340	43.03
Overweight	280	35.44
Obese	170	21.51
Total	790	100

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Table 3. Prevalence of obesity and overweight based on demographic variables

Variables	Normal weight		Overweight		Obese		P-value[a]
	N	%	N	%	N	%	
Age (year)							
20-30	31	3.92	15	8.98	4	0.50	< 0.001
30-40	31	3.92	44	9.87	22	6.20	
40-50	47	5.94	71	9.11	39	4.93	
50-60	92	11.64	72	5.56	49	2.78	
60-70	139	17.59	78	1.89	56	7.08	
Gender							
Male	64	8.10	206	26.07	125	15.82	< 0.001
Female	176	22.27	74	9.36	45	5.69	
Educational level							
Illiterate	15	1.89	15	1.89	7	0.88	0.53
Elementary grade	51	6.45	35	4.43	17	2.15	
Secondary grade	55	6.96	56	7.08	30	3.79	
High School and Diploma	69	8.73	68	8.60	37	4.68	
Associate Degree	77	9.74	53	6.70	39	4.93	
Bachelor	37	4.68	23	2.91	22	2.78	
Master's degree and higher	36	4.55	30	3.79	18	2.27	
Marital status							
Single	89	11.26	74	9.36	42	5.31	0.93
Married	209	26.45	172	21.77	34	4.30	
Divorced or widowed	42	5.31	98	12.40	22	2.78	
Job							
Student	16	2.02	20	2.53	15	1.89	< 0.001
Employee	70	8.86	45	5.69	30	3.79	
Self-employment	160	20.25	42	5.31	21	2.65	
Unemployed or housewife	72	9.11	159	20.12	90	11.39	
Retired	22	2.78	14	1.77	14	1.77	
Income adequacy							
Yes	158	20	40	5.06	86	10.88	0.03
Somewhat	123	15.56	120	15.18	48	6.07	
No	59	7.46	120	15.18	36	4.55	
Mobility status							
Inactive	169	21.39	66	8.35	65	8.22	< 0.001
Middle	106	13.41	117	14.81	97	12.27	
Much	65	8.22	67	8.48	56	7.08	

[a]: Chi-square

Discussion

According to the results of this cross-sectional study, the prevalence of overweight and obesity was 35.44% and 21.51%, respectively. In Ghadiri-Anari study, the prevalence of overweight and obesity in Yazd was 29% and 9.50%, respectively (Ghadiri-Anari *et al.*, 2013). Mirzaei et al. investigated 9991 people in Yazd and found that the prevalence of overweight was 37.70%, while the prevalence of obesity was 27% (Mirzaei *et al.*, 2017a), which shows the growing trend of obesity in Yazd. Rashidy-pour et al. examined the prevalence of obesity among the Iranian population and found that the prevalence of overweight and obesity was 36.50% and 33.30% in West Azerbaijan as well as 40.60% and 26.30% in Semnan province, respectively (Rashidy- Pour *et al.*, 2019). In the study by Zar et al., the prevalence of overweight and obesity was reported as 17.30% and 29.60% in Shiraz, respectively (Zar A *et al.*, 2017). In Nagata's study in the US, 48% of people were obese (Nagata *et al.*, 2018). Numerous

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studies in different parts of Iran investigated the prevalence of obesity and overweight in different population groups (Akhondi *et al.*, 2019, Khateri *et al.*, 2019, Rafati Fard *et al.*, 2019, Salimi *et al.*, 2019). The prevalence of obesity and overweight in different studies in various cities of Iran showed a wide variety, which may be due to the ethnic, cultural, social, ecological, genetic characteristics as well as dietary habits. The prevalence of chronic diseases (such as hypertension and diabetes), which are resulted from overweight and obesity is extremely worrying in Iran, especially in Yazd. Therefore, media and nutrition practitioners should make every effort to bring people back to using traditional and healthy foods as well as having active lifestyles.

In the present study, the prevalence of overweight and obesity in women was significantly higher than men. This finding is consistent with the results of the studies by Mirzaei et al. (Mirzaei *et al.*, 2017a), Abdollahi et al. (Abdollahi and Vagari, 2010), Nagata et al. (Nagata *et al.*, 2018), and Jeffery et al. (Jeffery and Rick, 2012). However, it contradicts with the results of the study by Mojtahedzadeh et al. (Mojtahedzadeh *et al.*, 2017), Rahmati (Rahmati, 2012), and Al-Isa (Al-Isa, 2014). Women are responsible for cooking food at home and spend most of their time in the kitchen. Women are less active and have less muscle tissue than men. Female physiology, sex hormones, and pregnancy overweight may cause overweight and obesity among them.

The prevalence of obesity and overweight increased with age and this correlation was statistically significant. The prevalence of overweight and obesity was statistically significant in different age groups. This finding is consistent with the results reported by Mirzaei et al. (Mirzaei *et al.*, 2017a), Monfared et al. (Monfared A *et al.*, 2017), Abdollahi et al. (Abdollahi and Vagari, 2010), Mohammadi et al. (Mohammadi, 2017), Mojtahedzadeh et al. (Mojtahedzadeh *et al.*, 2017), Allman et al. (Allman-Farinelli *et al.*, 2010), and Caban et al. (Caban *et al.*, 2015). Many people become obese as they get older. This condition is resulted from a variety of factors including poor diet, sedentary lifestyle, genetic factors, social factors, medication use, and hormonal changes. By reducing physical activity, more calories are stored as fat, instead of being converted into energy, which result in decreased muscle mass. You cannot avoid aging, but your lifestyle choices may slow or speed the process.

The prevalence of overweight and obesity was significantly different with regard to participants' occupation. This finding is consistent with the results reported by Mojtahedzadeh et al. (Mojtahedzadeh *et al.*, 2017) and Mohammadi et al. (Mohammadi, 2017). Studies in different countries also showed that the labor force experienced an increasing trend of obesity and overweight in recent years (Allman-Farinelli *et al.*, 2010, Caban *et al.*, 2015). It is hypothesized that occupation can lead to weight gain through three mechanisms: A) occupational stress can affect behaviors such as drinking alcohol and sedentary lifestyle; B) psychological stressors may modulate endocrine factors associated with weight gain; C) long working hours, shift work, and overtime may cause fatigue and reduce obesity-related health behaviors (Yamada *et al.*, 2002). The workplace is a good place to teach obesity-related preventive behaviors. So, health authorities are recommended to design training programs in these places.

The results showed a statistically significant relationship was found between income adequacy and prevalence of obesity and overweight, so that overweight and obesity were more common in people with lower income. This finding is in agreement with the results of the research by Azarbayjani et al. (Azarbayjani *et al.*, 2011), Singh et al. (Singh *et al.*, 2018), Malina et al. (Malina *et al.*, 2009), Santos et al. (Santos *et al.*, 2018), and Sutherland et al. (Sutherland *et al.*, 2018). However, this finding contradicted with the findings reported by Mojtahedzadeh et al. (Mojtahedzadeh *et al.*, 2017). People with favorable socioeconomic status have access to better nutrition and more sports facilities. They have more money to go to sports centers and care more about their health and fitness. People with low socioeconomic status are unable to obtain

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healthy foods; as a result, they eat junk and cheap foods that will lead to obesity.

Based on the results, the prevalence of obesity and overweight was lower in people with higher mobility, which is consistent with findings of the studies by Azerbayjani et al. (Azarbayjani *et al.*, 2011), Moradi et al. (Moradi, 2014), and Wiklund et al. (Wiklund, 2016). Inactivity and sedentary life style have always been one of the major causes of obesity. However, research findings on the effect of exercise on weight control were not consistent (Cink and Thomas, 2018). Decreased physical activity and increased sedentary behavior are factors contributing to obesity. High levels of physical activity and successful maintenance of body weight may be resulted from a better balance between energy intake and energy intake. One strength of this study was its relatively large sample size.

Conclusion

According to the results of the present study, obesity and overweight are among the major public health problems in Yazd city, especially for women and older age groups. Therefore, health centers are recommended to design health plans and nutritional support to reduce this health problem in Yazd.

Conflict of interest

The authors stated no conflict of interest.

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Authors' contributions

Ehrampoush MH was involved in designing and supervising the study. Marzban A was involved in designing the study, data collecting, and data analyzing. Jambarsang S participated in data analysis. Marzban A, Nadjarzadeh A, Abbasi-Shavazi M, and Rezaei MR participated in writing the manuscript. All authors critically reviewed the manuscript and approved the final version submitted for publication.

References

Abdollahi AA & Vagari G 2010. The correlation between age, gender and education with obesity in urban population of Golestan province. *Iranian Journal of Endocrinology and Metabolism.* **12 (3)**: 276-282.

Adetunji AE, et al. 2019. Socio-demographic factors associated with overweight and obesity among primary school children in semi-urban areas of mid-western Nigeria. *PloS one.* **14 (4)**: e0214570.

Aguilera C, et al. 2019. Obesity: risk factor or primary disease? *Revista medica de Chile.* **147 (4)**: 470-474.

Akhondi N, et al. 2019. General and abdominal obesity in relation to the prevalence of irritable bowel syndrome. *Neurogastroenterology & Motility.* **31 (4)**: e13549.

Al-Isa A 2014. Body mass index, overweight and obesity among Kuwaiti intermediate school adolescents aged 10–14 years. *European Journal of Clinical Nutrition.* **58 (9)**: 1273-1277.

Allman-Farinelli MA, Chey T, Merom D & Bauman AE 2010. Occupational risk of overweight and obesity: an analysis of the Australian Health Survey. *Journal of Occupational Medicine and Toxicology.* **5 (1)**: 1-9.

Azarbayjani MA, Tojari F & Habibinejad M 2011. The relationship between obesity, physical activity and socioeconomic status among girl students living in northern Tehran. *Feyz Journal of Kashan University of Medical Sciences.* **15 (2)**: 15-22.

Benusic M & Cheskin LJ 2019. Obesity prevalence in large US cities: association with socioeconomic indicators, race/ethnicity and physical activity. *Journal of Public Health.* **24 (12)**: 57-61.

Caban AJ, et al. 2015. Obesity in US workers: The national health interview survey, 1986 to 2002. *American Journal of Public Health.* **95 (9)**: 1614-1622.

Cink R & Thomas T 2018. Validity of the Astrand-Ryhming nomogram for predicting maximal oxygen intake. *British Journal of Sports Medicine.* **15 (3)**: 182-185.

[Downloaded from jnfs.ssu.ac.ir on 2026-11-13]

[DOR: 20.1001.1.24767417.2020.5.3.7.6]
[DOI: 10.18502/jnfs.v5i3.3791]

Daepp MI, Gortmaker SL, Wang YC, Long MW & Kenney EL 2019. WIC food package changes: trends in childhood obesity prevalence. *Pediatrics.* **143 (5)**: e20182841.

Ghadiri-Anari A, et al. 2013. Prevalence of obesity and overweight among adults in Iranian population (Yazd Province). *Iranian Journal of Diabetes and Obesity.* **5 (2)**: 67-70.

GO C 2017. Health effects of overweight and obesity in 195 countries over 25 years. *New England Journal of Medicine.* **377 (1)**: 13-27.

Haegele JA, Aigner CJ & Healy S 2019. Physical activity, body mass index, and health status among youth with severe visual impairments aged 13–17 years in the United States. *Disability and Health Journal.* **12 (1)**: 24-28.

Haire- Joshu D, et al. 2019. Randomized Controlled Trial of Home- Based Lifestyle Therapy on Postpartum Weight in Underserved Women with Overweight or Obesity. *Obesity.* **27 (4)**: 535-541.

Hales CM, Fryar CD, Carroll MD, Freedman DS & Ogden CL 2018. Trends in obesity and severe obesity prevalence in US youth and adults by sex and age, 2007-2008 to 2015-2016. *Journal of the American Medical Association.* **319 (16)**: 1723-1725.

Jayasekara H, et al. 2018. Associations of alcohol intake, smoking, physical activity and obesity with survival following colorectal cancer diagnosis by stage, anatomic site and tumor molecular subtype. *International Journal of Cancer*. **142 (2)**: 238-250.

Jeffery RW & Rick AM 2012. Cross- sectional and longitudinal associations between body mass index and marriage- related factors. *Obesity Research.* **10 (8)**: 809-815.

Karimi N 2017. Investigation of Abdominal Obesity Prevalence and Cardiovascular Fitness among the Citizens of Babolsar, Iran, in 2017. *Journal of Health Research in Community*. **3 (3)**: 70-81.

Khateri S, et al. 2019. Prevalence of obesity and overweight in Iranian children aged less than 5 years: a systematic review and meta-analysis. *Korean Journal of Pediatrics.* **62 (6)**: 206-212.

Malina RM, Peña Reyes ME & Little BB 2009. Socioeconomic variation in the growth status of urban school children 6–13 years in Oaxaca, Mexico, in 1972 and 2000. *American Journal of Human Biology.* **21 (6)**: 805-816.

Mirzaei M, et al. 2017a. Prevalence of general obesity and central adiposity and its related factors in adult population of Yazd. *SSU_Journals.* **25 (9)**: 736-747.

Mirzaei M, et al. 2017b. Prevalence of general obesity and central adiposity and its related factors in adult population of Yazd. *Shahid Sadoughi University of Medical Sciences Journal.* **25 (9)**: 736-747.

Mohammadi M 2017. The prevalence of obesity in the elderly in Tehran and its relation to mental health. *Nursing of the Vulnerable Journal.* **3 (9)**: 1-13.

Mojtahedzadeh SM, Holakouie-Naieni K, Nematollahi S & Mazarei AH 2017. Prevalence of overweight and obesity in the personnel of Abadan oil refinery and factors related to it. *Journal of School of Public Health and Institute of Public Health Research.* **15 (1)**: 35-46.

Monfared A, Hatami H & Isabeighlou H 2017. Prevalence and associated factors of over weight and obesity in reproductive-aged woman in Rasht (2015). *Journal of Health in Field.* **4 (1)**: 11-17.

Moradi F 2014. Effect of twelve weeks aerobic training on chemerin, active ghrelin, and appetite in sedentary obese men. *Metabolism and Exercise.* **3 (2)**: 89-181.

Nagata JM, Garber AK, Tabler JL, Murray SB & Bibbins-Domingo K 2018. Prevalence and correlates of disordered eating behaviors among young adults with overweight or obesity. *Journal of General Internal Medicine.* **33 (8)**: 1337-1343.

Rafati Fard M, Mazloomy Mahmoodabad S, Fallahzadeh H, Haghi M & Asadi M 2019. Prevalence of obesity and overweight among office workers of pars special economic energy zone, Assaluyeh, Iran. *Healthy Aging Research.* **8 (1)**: 54-62.

Rahmati R 2012. The prevalence of obesity in primary schools of Golestan province of Iran. *Journal of Payavard Salamat.* **5 (4)**: 24-31.

[Downloaded from jnfs.ssu.ac.ir on 2026-11-13]

[DOR: 20.1001.1.24767417.2020.5.3.7.6]
[DOI: 10.18502/jnfs.v5i3.3791]

Ramezankhani A, Dolati MR, Hosein.pour Marjan, Hosein.pour Mojgan & Khodakarim S 2013. The study on relationship between education, employment and economic status of parents with overweight and obesity in students of primary schools in different parts of Tehran, 2012 *Iranian Journal of Nutrition Sciences & Food Technology*. **7 (5)**: 34-51.

Rashidy- Pour A, Malek M, Eskandarian R & Ghorbani R 2019. Obesity in the Iranian population. *Obesity Reviews.* **10 (1)**: 2-6.

Rozita Z, Lim M & Lee H 2019. Prevalence of elevated body mass index condition and its associated demographic variables among adults in urban areas in Johor, Malaysia. *Medical Journal of Malaysia.* **74 (2)**: 145-150.

Salimi Y, Taghdir M, Sepandi M & Zarchi A-AK 2019. The prevalence of overweight and obesity among Iranian military personnel: a systematic review and meta-analysis. *BMC Public Health.* **19 (1)**: 162-175.

Santos R, Aires L, Santos P, Ribeiro JC & Mota J 2018. Prevalence of overweight and obesity in a Portuguese sample of adults: results from the Azorean Physical Activity and Health Study. *American Journal of Human Biology.* **20 (1)**: 78-85.

Singh GK, Kogan MD, Van Dyck PC & Siahpush M 2018. Racial/ethnic, socioeconomic, and behavioral determinants of childhood and adolescent obesity in the United States: analyzing independent and joint associations. *Annals of Epidemiology.* **18 (9)**: 682-695.

Skinner AC, Ravanbakht SN, Skelton JA, Perrin EM & Armstrong SC 2018. Prevalence of obesity and severe obesity in US children, 1999–2016. *Pediatrics.* **141 (3)**: e20173459.

Sutherland R, Finch M, Harrison M & Collins C 2018. Higher prevalence of childhood overweight and obesity in association with gender and socioeconomic status in the Hunter region of New South Wales. *Nutrition & Dietetics.* **65 (3)**: 192-197.

Wiklund P 2016. The role of physical activity and exercise in obesity and weight management: Time for critical appraisal. *Journal of Sport and Health Science.* **5 (2)**: 151-154.

Yamada Y, Ishizaki M & Tsuritani I 2002. Prevention of weight gain and obesity in occupational populations: a new target of health promotion services at worksites. *Journal of Occupational Health.* **44 (6)**: 373-384.

Zar A, Karan Kp & Ahmadi Ma 2017. Prevalence Of Obesity And Overweight Among Female Students Of Shiraz University Of Medical Sciences And Its Association With Physical Fitness Factors. *Community Health.* **2 (4)**: 79-89.

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