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An In-Depth Regression Analysis on Anthropometric Indices Influencing Subjective Weight Perception

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ABSTRACT

Background: Subjective weight perception significantly impacts overall health and is influenced by various factors. This study aims to develop predictive models using anthropometric indices to estimate subjective weight perception in women.

Methods: This descriptive cross-sectional study involved a random sample of 287 women, aged 18-45, with a body mass index (BMI), ranging from 18.5 to 40.0 kg/m^2 who were referred to a nutrition clinic in Ardabil city between May and September 2023. Weight, BMI, waist-to-hip ratio (WHR), waist circumference (WC), waist-to-height ratio (WHtR), body adipocyte index (BAI), abdominal volume index (AVI), and conicity index (CI) were measured using standardized procedures. Subjective weight was assessed using a subscale of the Multidimensional Body Self-Relation Questionnaire. Regression analysis was employed to develop prediction models.

Results: The predictive equation for subjective weight was 2.548 + (-0.303 × weight in kg) + (0.089 × BMI in kg/m^2) + (27.773 × WHR) + (1.032 × WC in cm) + (-109.256 × WHR) + (0.540 × BAI in %) + (-0.260 × AVI in m^2) + (-39.423 × CI in $m^{3/2}kg^{-1/2}$). The model accounted for 78.50% of the variance and significantly predicted subjective weight perception ($F(8, 279) = 104.604$, and $p < 0.001$). Weight, WHR, WC, WHtR, BAI, and CI significantly contributed to the model ($p < 0.05$).

Conclusion: The findings underscore the importance of considering multiple anthropometric indices to understand individual differences in subjective weight perception. This understanding will be essential for developing more effective approaches to overall health.

Keywords: Anthropometry, Regression Analysis, Weight perception, Women

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Introduction

Subjective Weight Perception (SWP) refers to how closely an individual's perceived weight aligns with her/his actual weight status (1). This perception significantly influences health-related behaviors (2) and can contribute to issues such as eating disorders, restrictive diets, low self-esteem, and weight gain (3). Various factors, including societal expectations (4), media influences (5), race (6), gender (7), and age (8) affect SWP.

This issue is more common among women than men (9). Contrary to the belief that it primarily affects adolescents and young adults, recent studies indicated that weight misperception persists throughout life, especially during middle age, and warrants greater attention (10). Perceived weight predicts weight management behaviors (11), highlighting the need for appropriate training programs to address this concern.

Research has established a link between body mass index (BMI) and body image dissatisfaction (12, 13). Recently, anthropometric indices such as waist circumference (WC), waist-to-hip ratio (WHR), waist-to-height ratio (WHtR), abdominal volume index (AVI), body adiposity index (BAI), and conicity index (CI) have been recommended as screening tools (14). These indices have shown significant predictive values in SWP (15), necessitating further research to understand their influence fully. Despite its importance for psychological and general health, few studies have investigated the factors influencing subjective weight perception. This study aims to develop

equations for predicting subjective weight perception in women, using weight, BMI, WHR, WC, WHtR, BAI, AVI, and CI.

Methods

Study samples

The sample size was calculated to be 122 utilizing the Green formula (16) with nine predictors. To enhance the reliability of the results, the statistical population for this descriptive cross-sectional study included 287 non-pregnant, non-lactating women, aged 18-45 (mean age: 31.94 ± 8.07 years), who had a BMI ranging from 18.5 to 40.0 kg/m². Participants were selected through random convenience sampling from a nutrition clinic in Ardabil City; they had maintained a consistent body weight for three months before the study. The study protocol received approval from the Ethics Committee of Ardabil University of Medical Sciences (IR.ARUMS.REC.1398.549).

Data collection

All anthropometric measurements were conducted using accurate equipment and standardized protocols. Body weight and height were measured with participants wearing light clothing and barefoot. A digital scale (Omron BF511, Omron Healthcare Co, Kyoto, Japan) with an accuracy of 0.1 kg and a stadiometer (SECA 213, Seca Ltd., Hamburg, Germany) accurate to the nearest 0.1 cm were used to measure weight and height, respectively. The following formulas were used to calculate various indices:

- BMI: Weight (kg) divided by squared height (m²)
- WHR: Waist circumference (cm) divided by hip circumference (cm)
- WHtR: Waist circumference (cm) divided by height (cm)
- BAI: (Hip circumference (cm) divided by height (m) $^{1.5}$)-18
- AVI: [2 × (waist circumference (m)² + 0.7 × (waist circumference (m) - hip circumference (m)) ²]
- CI:

$$\text{waist circumference(m)}/(0.109\sqrt{\text{weight(kg)} \times \text{height(m)}})$$

Subjective weight perception was evaluated using a subscale of the Multidimensional Body Self-Relations Questionnaire (MBSRQ), with responses collected on a 5-point Likert scale. This questionnaire was developed by Cash. The long-form MBSRQ consists of 69 items with 10 subscales: appearance evaluation, appearance orientation, fitness evaluation, fitness orientation, health evaluation, health orientation, illness orientation, body areas satisfaction, subjective weight perception, and self-classified weight (17). The current study utilized the Persian version of this questionnaire which has confirmed reliability and validity, with a Cronbach's alpha of 0.88 (18).

The data analysis was performed utilizing SPSS software, version 21.0. The distribution of variables was assessed using the Kolmogorov-Smirnov test and visualized through histograms. Parametric tests were used because the quantitative variables showed a normal distribution. Regression analysis was conducted to explore multiple predictors of subjective weight perception. All statistical tests were two-sided, with a significance level of $p < 0.05$.

Results

Table 1 provides the anthropometric characteristics of the study population. The mean subjective weight perception score was 4.06 ± 1.01. A significant correlation was found between subjective weight perception and weight (r = 0.660), BMI (r = 0.669), waist-to-hip ratio (r = 0.664), waist circumference (r = 0.668), waist-to-height ratio (r = 0.644), body adiposity index (r = 0.583), abdominal volume index (r = 0.614), and conicity index (r = 0.569). In all cases, the p-value was less than 0.001.

Table 1. Mean anthropometric measurements of the participating women

Variable	Mean ± SD
Weight (kg)	79.97 ± 15.86
BMI (kg/m^2)	30.09 ± 5.91
Waist-to-hip ratio	0.89 ± 0.02
Waist circumference (cm)	92.97 ± 11.51
Waist-to-Height Ratio	0.59 ± 0.06
Body adipocyte index (%)	33.85 ± 3.77
Abdominal volume index (m^2)	17.82 ± 4.20
Conicity index (m$^{3/2}$kg$^{-1/2}$)	1.21 ± 0.04

Table 2 provides the multiple regression results for estimating subjective weight perception based on anthropometric measurements. The findings indicated that the models explain a significant amount of variation in SWP according to R2 values. On the other hand, the Adjusted R2 values suggested that the inclusion of each additional variable enhances the models' explanatory power (Table 2).

Table 2. Multiple regression (stepwise) equations for estimating subjective weight perception based on anthropometric measurements

Model	Variables entered	R	R^2	Adjusted R^2	F	B	SE	Beta	t
1	Weight	0.751	0.564	0.563	370.022	0.048	0.002	0.751	19.236$^{\times\times\times}$
2	Weight + BMI	0.797	0.635	0.632	247.513	0.006	0.006	0.100	1.052
						0.120	0.016	0.703	7.420$^{\times\times\times}$
3	Weight + BMI+ WHR	0.810	0.656	0.652	172.057	0.012	0.006	0.196	2.033$^{\times}$
						0.065	0.022	0.381	2.920$^{\times\times}$
						4.027	1.232	0.265	3.269$^{\times\times}$
4	Weight + BMI+ WHR+ WC	0.810	0.656	0.651	128.765	0.021	0.018	0.333	1.196
						0.072	0.026	0.424	2.756$^{\times\times}$
						4.590	1.637	0.302	2.804$^{\times\times}$
						-0.018	0.035	-0.209	-0.523
5	Weight + BMI+ WHR+ WC+ WHtR	0.801	0.641	0.634	82.964	-0.042	0.048	-0.667	-0.868
						0.204	0.104	1.220	1.966$^{\times}$
						3.525	1.786	0.235	1.973$^{\times}$
						0.088	0.088	1.012	0.997
						-13.933	11.344	-1.006	-1.228

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Model	Variables entered	R	R^2	Adjusted R^2	F	B	SE	Beta	t
6	Weight + BMI+ WHR+ WC+ WHtR+ BAI	0.856	0.732	0.725	105.335	-0.069 0.311 59.315 0.411 - 158.259 1.048	0.042 0.091 6.482 0.084 19.017 0.118	-1.105 1.864 3.958 4.737 - 11.432 3.637	-1.657××× 3.438××× 9.150××× 4.865××× -8.322××× 8.862×××
7	Weight + BMI+ WHR+ WC+ WHtR+ BAI+ AVI	0.878	0.771	0.764	110.843	-0.039 0.170 15.393 0.464 -51.817 0.332 -0.749	0.039 0.087 9.231 0.079 24.474 0.158 0.120	-0.628 1.019 1.027 5.344 -3.743 1.152 -3.158	-1.008 1.960 1.668 5.892××× -2.117× 2.097× -6.265×××
8	Weight + BMI+ WHR+ WC+ WHtR+ BAI+ AVI+ CI	0.886	0.785	0.778	104.604	-0.303 0.089 27.773 1.032 - 109.256 0.540 -0.260 -39.423	0.079 0.087 9.531 0.167 28.101 0.163 0.173 10.281	0.079 0.087 9.531 0.167 28.101 0.163 0.173 10.281	-3.861××× 1.028 2.914×× 6.187××× -3.888××× 3.312×× -1.505 -3.834×××

××× P < 0.001
×× P < 0.01
× P < 0.05
BMI: body mass index; WHR: waist-to-hip ratio; WC: waist circumference; WHtR: waist-to-height ratio; BAI: body adipocyte index; AVI: abdominal volume index; CI: conicity index

Weight was the initial variable in the model, and a linear regression analysis predicted participants' subjective weight perception from their actual weight. Weight strongly predicted subjective weight perception (R = 0.751), accounting for 56.4% of the variance. The final predictive model was a 0.215 + 0.048(weight) score. This means that a one-unit increase in weight corresponds to a 0.048 increase in SWP. The finding highlighted the importance of actual weight in shaping individuals' perceptions of their weight, which could have implications for interventions aimed at body image and weight management.

Weight and BMI were analyzed in a multiple regression model to predict subjective weight perception. BMI was a significant predictor and improved predictive accuracy, while weight was not found to be significant. The final model was:

Subjective weight = -0. 173 + (0. 006 × weight) + (0. 120 × BMI).

Therefore, a one-unit increase in BMI was associated with a 0. 120 increase in subjective weight perception. This indicated that BMI had a greater impact on an individual's weight perception compared to their actual weight.

A multiple regression analysis revealed that weight, BMI, and WHR can predict subjective weight. The inclusion of WHR significantly improved the model, resulting in an R-value of 0. 810. All predictors significantly contributed to the model. The final predictive equation was as follows:

Subjective weight = -2.517 + (0.012 × weight) +

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(0.065 × BMI) + (4.027 × WHR).

The high R-value suggests a strong positive relationship between weight, BMI, WHR, and subjective weight perception. In this model, WHR had the largest coefficient, indicating the greatest impact on subjective weight perception compared to weight and BMI. This finding can aid in understanding the varying influences of different anthropometric measurements on individuals' perceptions of their weight.

The study utilized multiple regression to predict subjective weight based on weight, BMI, WHR, and WC. The model explained 65. 6% of the variance, with BMI and WHR, showing significant contributions. It appears that BMI and WHR are key factors in influencing subjective weight perception. A higher positive coefficient in waist-to-hip ratio and a measure of body fat distribution suggested that individuals with higher WHR values perceived themselves as heavier. The final predictive equation was:

Subjective weight = -2.220 + (0.021 × weight) + (0.720 × BMI) + (4.590 × WHR) + (-0.018 × WC).

A multiple regression analysis was performed to evaluate the predictive capacities of weight, BMI, WHR, WC, and WHtR on subjective weight perception. The results showed that BMI and WHR made significant contributions to the model, while weight, WC, and WHtR did not. This not only confirmed the importance of weight, BMI, WHR, WC, and WHtR in influencing how individuals perceive their weight but also underscored the complexity of this phenomenon. The final predictive model was:

Subjective weight = -2.151 + (-0.042 × weight) + (0.204 × BMI) + (3.525 × WHR) + (0.088 × WC) + (-13.344 × WHtR).

A multiple regression analysis assessed weight, BMI, WHR, WC, WHtR, and BAI as predictors of subjective weight perception. The model explained 73. 2% of the variance and was deemed statistically significant. Surprisingly, weight was not found to be a significant predictor ($p > 0.05$), suggesting that it does not play a crucial role in determining how individuals perceive their weight. Instead, alternative anthropometric measurements such as BMI, WHR, WC, WHtR, and BAI may have a more significant impact. This finding challenges the conventional belief that weight alone influences subjective weight perception, highlighting the importance of considering multiple anthropometric measures. The final predictive model was as follows:

Subjective weight = -34.244 + (-0.069 × weight) + (0.311 × BMI) + (59.315 × WHR) + (0.411 × WC) + (-158.259 × WHtR) + (1.048 × BAI).

A multiple regression found that weight, BMI, WHR, WC, WHtR, BAI, and AVI significantly predicted subjective weight, explaining 77. 1% of the variance. Specially, WC, WHtR, BAI, and AVI were found to be significant predictors ($p < 0.05$). The significance of WC, WHtR, BAI, and AVI in the model emphasized the role of abdominal obesity in influencing subjective weight perceptions. The final predictive model was:

Subjective weight = -22.691 + (-0.039 × weight) + (0.170 × BMI) + (15.393 × WHR) + (0.464 × WC) + (-51.817 × WHtR) + (0.332 × BAI) + (-0.749 × AVI).

The final multiple regression analysis revealed that weight, WHR, WC, WHtR, BAI, and CI were significant predictors of subjective weight, explaining 78. 5% of the variance. Positive coefficients for BMI, WHR, WC, and BAI suggested a link to higher subjective weight, while negative coefficients for weight, WHtR, AVI, and CI indicated lower subjective weight. The high coefficients for WHtR, CI, and WHR emphasized their significant impact on subjective weight perception. The final predictive model was:

Subjective weight = 2.548 + (-0.303 × weight) + (0.089 × BMI) + (27.773 × WHR) + (1.032 × WC) + (-109.256 × WHtR) + (0.540 × BAI) + (-0.260 × AVI) + (-39.423 × CI).

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Discussion

Distorted weight perception is a significant risk factor for poor mental health, including suicidality (19, 20, 21), depression, stress (21, 22), and substance use (20). Subjective weight perception can lead to reduced engagement in health-promoting behaviors and weight gain over time (23, 24). Additionally, weight misperception is a strong predictor of body dissatisfaction (25). Given the social and health burdens associated with these mental health issues and body dissatisfaction, it is crucial to examine the factors contributing to SWP (26).

In this study, simple equations were developed to predict subjective weight perception based on easily obtainable anthropometric indices. These indices are crucial tools for assessing health risks which can be feasibly used in clinical practice and for evaluating large population groups. The results indicated that various anthropometric measurements, such as BMI, WHR, WC, WHtR, BAI, and CI significantly influenced SWP. A study reported a strong positive correlation between various anthropometric indices and subjective weight perception among women (27). The impact of each of these measurements varied, which aligned with the results of previous studies (15, 28). Each measurement provided distinct information on body composition and fat distribution, which are essential for assessing an individual's health status. However, the differing effects of each measurement underscored the complexity of body composition and emphasized the importance of a comprehensive approach to health assessments.

The findings indicated a strong relationship between weight and SWP, as weight is a direct measure of BMI (R = 0.751). This relationship was significant because it highlighted how objective measures of BMI can influence subjective weight perceptions. BMI has long been recognized as a critical indicator of health status (29). Over the past decades, global stigmatization of obesity has increased (30), and society often holds individuals responsible for their obesity (31). This perceived stigma can affect SWP and is influenced by social weight norms and body ideals (32). The strong relationship between weight and SWP shows the importance of addressing weight stigma and promoting a more inclusive approach to body weight and health. In cross-country research, it was found that body dissatisfaction increases with a higher BMI (33) and this correlation was associated with extreme weight control behaviors (31, 32).

The use of combined anthropometric measurements provides a more comprehensive evaluation of an individual's health (34). More accurate assessments of weight perception have been achieved using both BMI and waist circumference compared to BMI alone (35). The WHR has been reported as the most important predictor of subjective weight (15). WC and WHR provide insight into fat distribution patterns, particularly the accumulation of visceral fat, which is a critical determinant of health risks. BAI, AVI, and CI can collectively enhance our understanding of body composition and its implications for health (36, 37). The results of this study emphasized the positive effect of BMI, WHR, WC, and BAI on subjective weight perception, providing further insight into the relationships between body fat distribution and SWP. This highlights the greater emphasis placed on physical appearance and body composition in women's lives. On the other hand, individuals may perceive their weight differently based on the index used (38), which should be taken into account. Understanding these correlations will help healthcare providers tailor effective interventions for weight management.

The strength of this study lies in its large sample size and consideration of a broader range of anthropometric indices. However, there are several limitations. First, the study did not examine gender, cultural, or social influences. Second, subjective weight was assessed using self-administered questionnaires, which may introduce bias.

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Furthermore, it should be noted that the study sample was limited to individuals attending a nutrition clinic, which may restrict the generalizability of the findings. Future research could focus on refining these equations and exploring their applicability in diverse populations to further validate their effectiveness and accuracy.

Conclusion

In summary, this study identified a combination of simple, valid, and quick anthropometric indices that can accurately predict subjective weight perception in women. The relationship between these anthropometric indices and subjective weight perception is complex. The findings highlight the importance of considering multiple anthropometric measurements when assessing subjective weight perception and related health outcomes. Fat distribution plays a vital role in this regard, and health promotion strategies can be specifically targeted towards these parameters.

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Conflict of interest

The author declared no conflict of interest.

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Ethical considerations

This study has been approved by the Ethics Committee of Ardabil University of Medical Sciences.

Code of ethical

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Authors' contributions

The author conducted the study, including data analysis, literature review, and manuscript preparation.

Open access policy

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References

1. Gao Q, Li R, Chen Z, et al. Weight self-perception and weight loss attempts in Chinese cardiovascular patients and non-cardiovascular patients: evidence from a population-based study. BMC Public Health. 2023; 23(1): 707.
2. Niswah I, Rah JH, Roshita A. The association of body image perception with dietary and physical activity behaviors among adolescents in Indonesia. Food and Nutrition Bulletin. 2021; 42(1_suppl): S109-21.
3. Silva SU, Alves MD, Vasconcelos FD, et al. Association between body weight misperception and dietary patterns in Brazilian adolescents: Cross-sectional study using ERICA data. PLoS One. 2021; 16(9): e0257603.
4. Jamani NA, MFamMed AH, MFamMed KH, et al. Agreement between body weight perception and body weight status among late adolescents in Kuantan, Malaysia. Medical Journal of Malaysia. 2020; 75(2): 159.
5. Uchôa FN, Uchôa NM, Daniele TM, et al. Influence of the mass media and body dissatisfaction on the risk in adolescents of developing eating disorders. International Journal of Environmental Research and Public Health. 2019; 16(9): 1508.
6. Pool AC, Coffman DL, Sarwer DB, et al. Associations between weight misperception, contextual factors, and weight loss behaviors in young adult men with overweight/obesity. Obesity Science & Practice. 2020; 6(1): 39-46.
7. Park B, Cho HN, Choi E, et al. Self-perceptions of body weight status according to age-groups among Korean women: A nationwide population-based survey. PloS one. 2019; 14(1): e0210486.
8. Alyousefi NA, Alqarni FD, Alqarni BS, et al. Association of weight misperception with weight loss attitudes, behaviors and psychological distress in Saudi adult population. Biomedical Research. 2017; 28(6).
9. Wilson OW, Jones H, Mama SK, et al. Female college student weight perception discordance. Journal of American

College Health. 2021; 69(1): 23-9.
10. Garrusi B, Baneshi MR. Body dissatisfaction among Iranian youth and adults. Cadernos de saude publica. 2017; 33: e00024516.
11. Wang Y, Liu H, Wu F, et al. The association between BMI and body weight perception among children and adolescents in Jilin City, China. PloS one. 2018; 13(3): e0194237.
12. Chen G, He J, Zhang B, et al. Body weight and body dissatisfaction among Chinese adolescents: Mediating and moderating roles of weight-related teasing. Current Psychology. 2019: 1-9.
13. Pop CL. Association between body mass index and self-body image perception. Iranian Journal of Public Health. 2017; 46(12): 1744.
14. Quaye L, Owiredu WK, Amidu N, et al. Comparative abilities of body mass index, waist circumference, abdominal volume index, body adiposity index, and conicity index as predictive screening tools for metabolic syndrome among apparently healthy Ghanaian adults. Journal of Obesity. 2019; 2019.
15. Ghannadiasl F. Novel anthropometric predictors of subjective weight among women. Women & Health. 2021; 61(9): 889-95. [Persian]
16. Green SB. How many subjects does it take to do a regression analysis? Multivariate Behavioral Research. 1991; 26(3): 499-510.
17. Cash TF. Multidimensional body-self relations questionnaire: MBSRQ user's manual. Norfolk, VA: Old Dominion University; 2000.
18. Rahati A. Evolutionary study of body image and its relationship with self-esteem based on a comparison between adolescent, middle age, and old people. Tehran: Shahed University. 2004; 34. [Persian]
19. Liu BP, Jia CX, Li SX. The association of weight control attempts with suicidality: The role of objective weight status and weight perception among adolescents of United States. Journal of Affective Disorders. 2023; 325: 369-77.
20. Lee KH, Bong SH, Kang DH, et al. Association between weight misperception and some mental health-related characteristics in Korean adolescents. Neuropsychiatric Disease and Treatment. 2020: 3053-62.
21. Hwang IC, Lee KS, Park DK, et al. Association with self-perception for obesity and mental health among Korean adolescents. Journal of the Korean Academy of Child & Adolescent Psychiatry. 2011; 22(2): 112-9.
22. Haynes A, Kersbergen I, Sutin A, et al. Does perceived overweight increase the risk of depressive symptoms and suicidality beyond objective weight status? A systematic review and meta-analysis. Clinical Psychology Review. 2019; 73: 101753.
23. Pearl RL. Weight bias and stigma: public health implications and structural solutions. Social Issues and Policy Review. 2018; 12(1): 146-82.
24. Pearl RL, Puhl RM, Lessard LM, et al. Prevalence and correlates of weight bias internalization in weight management: a multinational study. SSM-population Health. 2021; 13: 100755.
25. Gaylis JB, Levy SS, Hong MY. Relationships between body weight perceptions, body mass index, physical activity, and food choices in Southern California male and female adolescents. International Journal of Adolescence and Youth. 2020; 25(1): 264-75.
26. Paterna A, Alcaraz-Ibáñez M, Fuller-Tyszkiewicz M, et al. Internalization of body shape ideals and body dissatisfaction: A systematic review and meta-analysis. International Journal of Eating Disorders. 2021; 54(9): 1575-600.
27. Ghannadiasl F, Hoseini N. The Relationship between Body Image Dissatisfaction and New Anthropometric Indices in Women Referred to the Nutrition Clinic in Northwest of Iran, Ardabil City, 2019. J Community Health Research 2021; 10(3): 243-250. [Persian]
28. Khalesi M, Nasiri E, Samadi A. Prevalence of body weight misperception among female university students and its relationship with anthropometric indices: A concept for overweight and obesity management. Journal of Sabzevar University of Medical Sciences. 2024; 30(6): 732-41. [Persian]
29. Paulin A, Manikpurage HD, Després JP, et al. Sex-specific impact of body weight on atherosclerotic cardiovascular disease incidence in individuals with and without ideal cardiovascular health. Journal of the American Heart Association.

[DOI: 10.18502/jchr.v13i30.17567]

2023; 12 (13): e028502.

30. Tuffa TA, Gebreyesus SH, Endris BS, et al. Unhealthy weight control behaviors among Ethiopian female adolescents. International Journal of Eating Disorders. 2020; 53(4): 525-32.
31. Jeong E. Factors associated with the adoption of extreme weight control behavior by non-obese adolescents: a secondary analysis. BMC Pediatrics. 2023; 23(1): 464.
32. Lee K. Self-perceived weight and self-rated health have distinct relationships according to body mass index in Korean teenagers. Nutrition Research. 2022; 107: 179-86.
33. Hock K, Vanderlee L, White CM, et al. Body weight perceptions among youth from 6 countries and associations with social media use: Findings from the international food policy study. Journal of the Academy of Nutrition and Dietetics; 2024.
34. Wu Y, Li D, Vermund SH. Advantages and Limitations of the Body Mass Index (BMI) to Assess Adult Obesity. International Journal of Environmental Research and Public Health. 2024; 21(6): 757.
35. Linder J, McLaren L, Siou GL, et al. The epidemiology of weight perception: perceived versus self-reported actual weight status among Albertan adults. Canadian Journal of Public Health. 2010; 101: 56-60.
36. Cai J, Lin C, Lai S, et al. Waist-to-height ratio, an optimal anthropometric indicator for metabolic dysfunction associated fatty liver disease in the Western Chinese male population. Lipids in health and disease. 2021; 20: 1-2.
37. Ramírez-Manent JI, López-González ÁA, Tomás-Gil P, et al. Relationship between abdominal volume index and body adiposity index and scales of insulin resistance and metabolic syndrome. Diagnostics. 2023; 13(21): 3356.
38. Hudzik B, Nowak J, Szkodzinski J, et al. Discordance between body-mass index and body adiposity index in the classification of weight status of elderly patients with stable coronary artery disease. Journal of Clinical Medicine. 2021; 10(5): 943.

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