

Relation of health-related quality of life with abnormal weight: A cross-sectional study prior to the weight reduction intervention

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ABSTRACT

Objective: Obesity is a major health issue that is well-documented association with morbidity and mortality. The aim of this study was to investigate the associations between health-related quality of life (HRQOL) and abnormal body mass index (BMI) levels. **Materials and Methods:** This descriptive study assessed 134 healthy individuals with abnormal BMI aged 18–39 years, clustered into three weight categories. The Short-form (SF)-36 Questionnaire was used for measuring of HRQOL. **Results:** Linear-regression analyses discovered the negative correlation between BMI and the general health element of HRQL, however, a positive relation to role emotional dimension. But BMI was not associated with other six dimensions, and also with physical and mental component summary and with total health quality of life. **Conclusion:** BMI was an important detriment factor for the general health dimension of HRQL with regression analysis. The higher grade of abnormal BMI had a negative influence on general health and positive effect on the role emotional dimension of HRQOL.

Keywords: Body mass index, general health, obesity, overweight, short form-36

Introduction

The number of people suffering obesity (OB) is increasing worldwide. The frequency of overweight (OW) and OB has increased in Iranian adults within an 8-year period between 1999 and 2007.^[1] In Iran, the prevalence of OB was 21.5% in individuals aged 20 years and over.^[2] Another study focused on OB prevalence among male and female aged 30 years and showed above as 9.9% and 24.8% for, respectively.^[3] OB is the main public health problem that is connected with extensive morbidity and mortality.^[4,5] A number of investigators believe

that OB increased risk of making a variety of diseases, such as prediabetes, Type 2 diabetes mellitus, prehypertension, cardiovascular disease, gastrointestinal disease, nonalcoholic fatty liver disease, and certain cancers.^[6-9] Furthermore, the prevalence of metabolically unhealthy was higher among obese subjects than in normally weight individuals.^[10]

As the quality of life (QOL) should include all features of life, so its concept is difficult to implement. The World Health Organization defines the QOL as a state of complete physical, mental, and social welfare and not only the nothingness of disease or disability. One of the aspects that results in a significantly impaired QOL is an abnormal body mass index (BMI) including OW and OB.^[11,12] Investigations showed that increasing BMI deteriorates health-related quality-of-life (HRQOL) score.^[12,13] The available studies in the literature have established that physical well-being declines prominently with increasing grades

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of OW and OB.^[14,15] Victorzon *et al.*^[11] have reported that obese individuals had lesser QOL, primarily in the section of physical function. Although suggested that OB is accompanying with some loss of mental HRQL^[16], but de Zwaan *et al.*^[14] and Tsai *et al.*^[15] reported that there was an association between OB and impaired physical health but not with mental health.

In the all previous studies, researchers made no distinction between the OB levels or examined only two OB groups. In addition, investigators used different instrument to assess HRQOL. As a result, the aim of the study was to extent QOL in OW and obese healthy entities who are trying to reduce their weight. The region that this study is focused on is Jahrom, located in Fars province, in the southeast of Iran. The city and its suburban have 300,000 populations. This study also examines which aspects of QOL significantly impaired according to the BMI levels.

Materials and Methods

The participants were included 134 OW and obese individuals aged 18–39 years who had contacted the local health services to receive a dietary weight reduction plan. They were excluded if they had a positive history of any medical or psychiatric disorders, pregnancy or lactation, the use of medication (analgesic, anti-inflammation, corticosteroid, sedatives, and antipsychotic) and were trying to lose weight during the past 6 months.

This study was approved by the local Research Committee of Jahrom University of Medical Sciences (Ethics code: JUMS. REC.1392.03.21). The assortment implement of data was a questionnaire includes two parts. The first part of the questionnaire includes variables of age, sex, education, living place, history of diseases, pregnancy and lactation, and drug consumption. The second part was the QOL questionnaire. The Short Form-36 (SF-36) Health Survey Questionnaire that usually used for measuring of subjective health was used for assessing QOL. The validity and reliability of this questionnaire were established in the past^[17] and the translated version of SF-36 to the local language, i.e., Farsi, was confirmed by Montazeri *et al.*^[18] SF-36 contains eight subscales: physical function, physical role, body pain, general health, vitality, social functioning, emotional role, and general mental health, all of which measures are used to develop a summary measure of physical health (physical component summary [PCS]) and a summary measure of mental health (mental component summary [MCS]). The PCS includes those that quantify physical function (degree of limitation in performing activities of daily living), physical role (limitations in daily activities due to physical health), bodily pain (limitations in daily activities due to pain), and general health (self-evaluation of overall health). The MCS consists of those that quantify vitality (energy and fatigue), social functioning (limitations in social activities due to physical or emotional health), emotional role (limitations in usual role activities due to emotional problems), and general mental health (psychological distress and well-being). The SF-36 in every part scored between 0 and 100, and a lower score indicated a worse QOL in that special area.

Body weight and height were measured without shoes and heavy clothes. OW and OB were defined via BMI. BMI (weight [kilogram]/height [meter]²) was calculated using measured height and weight. BMI was classified as OW (OW; 25.0–<30.0), OB Grade 1 (30.0–<35.0), OB Grade 2 (35.0–<40.0), and OB Grade 3 (40.0 or over). In the analysis, we used OB1 for OB Grade 1 and OB2 as compute of BMI 35 or over (OB Grades 2 and 3).

Data analysis was performed using SPSS 16 software (SPSS Inc., Chicago, IL, USA). The data were shown as mean, standard deviation (SD), and percent. QOL area between the independent variables was compared using analysis of variance. Then, significant SF-36 subscales were used to explain by all predictor variables via multivariable regression. Forecasters were carefully chosen by use of a stepwise procedure with a significance level of 0.05 or less. $P \leq 0.05$ was deliberated as statistically significant.

Results

A total sample of 134 (93 females [69.4%]; 41 males, [30.6%]) subjects were evaluated. Table 1 lists the complete results of the analysis. The mean age was 25.63 years (SD: 4.57; range: 18–39), and the mean BMI was 32.1 kg/m² (SD: 4.4; range: 25.3–51.2). One hundred and ten (82.1%) subjects were from the urban area, 46 (36.6%) were unemployed (student, nonworking), and 83 (61.9%) were married (only one person was divorced). Furthermore, their educations were primary level for 3.0%, secondary for 13.4%, high school for 9.0%, diploma for 48.5%, and higher education for 26.1%. Forty-four individuals (32.8%) were OW, 65 subjects (48.5%) suffered from OB Grade 1, 16 (11.9%) from Grade 2, and 9 (6.8%) from Grade 3.

The BMI groups did not contrast with respect to age, years of education, sex distribution, residency, education level, marital status, and job status [Table 1].

Comparisons of QOL between participants by BMI group are shown in Table 2. Emotional role ($P = 0.038$) and general health ($P = 0.050$) subscales of SF-36 were significantly different according to the BMI groups. Therefore, OB2 individuals had significantly higher scores for emotional role ($P = 0.013$) subscales of the SF-36 than OB1 individuals. Furthermore, members with OB2 counted suggestively lower on the general health score than OB1 ($P = 0.030$) and OW ($P = 0.021$) subjects. No difference was observed according to the BMI groups for any of the six subscales of the SF-36, on the PCS and MCS score and on the total health SF-36 score. However, with the least significant difference component of *post hoc* multiple comparisons, there were statistically significant differences between some BMI subgroups. Physical function score ($P = 0.025$) and body pain score ($P = 0.043$) were significantly lower in OB2 subjects as compared to the OW individuals. Furthermore, OB2 participants scored considerably lower on the PCS score ($P = 0.025$) than the OW subjects.

Table 1: Demographic and social characteristics of all participants and according to the body mass index status

| Variables | Total | Overweight (n=44), n (%) | Obesity grade 1 (n=65), n (%) | Obesity grade 2, 3 (n=25), n (%) | n |
|---------------------------------|--------------|-----------------------------|----------------------------------|-------------------------------------|-------|
| Age (years), mean (SD) | 25.63 (4.57) | 25.04 (4.08) | 25.71 (4.43) | 26.47 (5.66) | 0.453 |
| Education (years), mean (SD) | 11.98 (2.87) | 12.30 (2.75) | 11.91 (2.93) | 11.60 (2.99) | 0.606 |
| Sex (female), n (%) | 93 (69.4) | 36 (81.8) | 43 (66.2) | 14 (56.0) | 0.060 |
| Residency (urban), n (%) | 110 (82.1) | 37 (84.1) | 49 (75.4) | 24 (96.0) | 0.067 |
| Education, n (%) | | | | | |
| Under diploma | 34 (25.4) | 7 (15.9) | 18 (27.6) | 9 (36.0) | 0.414 |
| Diploma | 65 (48.5) | 25 (56.8) | 30 (46.2) | 10 (40.0) | |
| High education | 35 (26.1) | 12 (27.3) | 17 (26.2) | 6 (24.0) | |
| Marital status (married), n (%) | 83 (61.9) | 25 (56.8) | 45 (69.2) | 13 (52.0) | 0.223 |
| Job, n (%) | | | | | |
| Unemployed | 49 (36.6) | 17 (38.6) | 23 (35.4) | 9 (36.0) | 0.468 |
| Employed | 38 (28.3) | 9 (20.5) | 19 (29.2) | 10 (40.0) | |
| Housewife | 47 (35.1) | 18 (40.9) | 23 (35.4) | 6 (24.0) | |

SD: Standard deviation

Table 2: Baseline short form 36 scores for participants with body mass index among individuals seeking weight reduction*

| | Overweight (n=44) | Obesity Grade 1 (n=65) | Obesity Grade 2, 3 (n=25) | P |
|----------------------------|-------------------|------------------------|---------------------------|-------|
| Physical functioning | 77.61 (22.76) | 73.81 (23.46) | 64.60 (21.69) | 0.078 |
| Physical role | 63.95 (29.53) | 62.30 (24.13) | 56.00 (36.29) | 0.526 |
| Body pain | 77.72 (22.99) | 68.61 (24.41) | 65.22 (26.40) | 0.074 |
| General health | 71.14 (15.69) | 69.92 (19.08) | 60.60 (18.88) | 0.050 |
| Vitality | 61.28 (18.03) | 64.14 (19.85) | 61.60 (18.30) | 0.708 |
| Social function | 72.86 (21.69) | 68.53 (25.97) | 67.24 (24.64) | 0.572 |
| Emotional role | 62.03 (29.74) | 52.90 (37.71) | 72.0 (34.33) | 0.038 |
| Mental health | 68.74 (18.64) | 68.19 (22.83) | 69.44 (20.97) | 0.968 |
| Physical component summary | 70.59 (14.37) | 67.63 (16.61) | 61.44 (17.06) | 0.078 |
| Mental component summary | 67.25 (15.23) | 64.89 (20.43) | 66.20 (17.21) | 0.805 |
| Total health score | 70.64 (13.57) | 67.08 (17.49) | 63.75 (15.55) | 0.217 |

*Values are means (SD). SD: Standard deviation; SF: Short form

Correlation analyses for the general health and emotional role scores of the SF-36 are shown in Table 3. Lower value on the general health score was attendant with higher BMI levels. However, there was no association between general health score and age, years of education, sex, residency, marital status, or job class. Furthermore, the emotional role score had no association with variables [Table 3].

Table 4 shows regression analyses for the general health score of the SF-36. A backward stepwise regression analysis was accompanied using the three variables of BMI groups, age, and marital status that had $P < 0.2$ resulted from univariable analysis. The BMI groups described 5.4% of the variance in the general health score. The results of regression analysis suggest that an increase of one BMI level decreases the general health score of the SF-36 by 4.79.

Discussion

The study investigated the association between BMI and HRQOL SF-36 in self-reported healthy individuals with abnormal BMI. The results show that the general health subscale and emotional role subscale of SF-36 had significantly different scores

according to BMI groups. Therefore, OB2 individuals reported a significantly greater decrement of general health scores than OB1 and OW individuals. Adversely, OB2 subjects had better HRQOL in the emotional role than OW subjects. The other six subscales of SF-36, MCS, PCS, and total health score were not different according to the BMI levels. The general health score had a significant correlation with BMI groups with the regression analysis.

Usually, OW and OB are negatively associated with lower QOL. In contrast to our results, other researchers found that individuals with a higher grade of OB significantly reported a greater reduction of total health and PCS score than less obese individuals.^[14,19] Pimenta *et al.* evaluated the correlation between OB and QOL in the sixty Brazilian individuals aged 20–60 years reported lower QOL in morbidly obese individuals compared with obese (Grades 1 and 2) individuals.^[20] Kortt and Dollery in an Australian’s general population found a negative association between SF-6D score with BMI and also they did not find a significant lower PCS score in obese Class 2 (BMI ≥ 30.0) than obese Class 1 (BMI: 25–29.9).^[21] Moreover, OB was significantly associated with a lower score of subjective QOL on physical dominions.^[22]

Table 3: Univariable correlation of the general health and emotional role scores of the short form-36 with some variables

| | General health | | Emotional role | |
|--------------------|-------------------------|-------|-------------------------|-------|
| | Correlation coefficient | P | Correlation coefficient | P |
| Age, years | -0.13 | 0.128 | 0.11 | 0.220 |
| Years of education | 0.08 | 0.382 | 0.1 | 0.238 |
| Sex | -0.01 | 0.988 | -0.06 | 0.522 |
| Residency | 0.04 | 0.624 | -0.09 | 0.339 |
| Marital status | -0.14 | 0.104 | -0.04 | 0.682 |
| Job class | -0.09 | 0.292 | -0.05 | 0.606 |
| BMI groups | -0.18 | 0.036 | 0.07 | 0.441 |

BMI: Body mass index

Table 4: Relationship of general health score with body mass index groups, age, and marital status by backward stepwise regression

| Variable | Cumulative R ² | Coefficient | P |
|----------------|---------------------------|-------------|-------|
| Constant | | 81.58 | |
| BMI groups | 0.054 | -4.79 | 0.033 |
| Marital status | 0.054 | -5.46 | 0.093 |
| Age | 0.06 | -0.32 | 0.384 |

BMI: Body mass index

According to Anandacoomarasamy *et al.*^[16] and Medhi *et al.*,^[23] obese subjects had significantly lower general health score that it was in line our results. Furthermore, Class 2 obese healthy individuals had significantly lower general health scores compared to Class 1 obese subjects.^[21]

In opposite to our finding, obese subjects had significantly lower SF-36 scores for an emotional role.^[16] Furthermore, Kortt and Dollery found a lower emotional role score in healthy Class 2 obese than in Class 1 obese.^[21] Moreover, for OW and obese patients in primary care were showed limitations in all factors of mental health.^[24] Our results suggest that there is no statistically significant difference between MCS scores with BMI groups. This effect is in line with previously published results, which established absolutely null or only a low significant relation between BMI and mental health (MCS) of QOL.^[14,21] The absence of a relation between BMI and mental HRQL is similar to the outcomes of Doll *et al.*^[25] who stated that emotional well-being did not worsen with the progress degree of BMI. However, Franquelo-Morales *et al.*^[26] among university students aged 18–30 years demonstrated a lower score of MCS in subjects with upper quartiles of fat mass.

Our results were different from the consequence of other available studies in literature that could be resulting in the existence of morbidities in participants impacting on QOL.^[27] In addition, in most of the available studies, the BMI was calculated using self-reported weight and height. However, in the present study, participants were without any history of disorders (self-reported).

The BMI groups correlated significantly with impaired general health scores. On the other hand, no relationship was found between the general health score and age, years of education,

sex, residency, marital status, and job class. Regression analysis including age and marital status indicated BMI groups to be only independent negative predictors of general health subscales of QOL. This study was a descriptive design with low sampling. Furthermore, a healthy subject is usually recorded on the basis of self-reporting by participants.

Conclusion

Our results indicate that an elevated BMI level is associated with a reduction of general health area of SF-36 health-related QOL. Thus, the management of obese individuals is a difficult because OB influence on QOL with various ways such as cultural setting. Abnormal BMI is one of the major health problems and reduces QOL. The study found that physicians paid special attention to the QOL of obese people.

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Conflicts of interest

There are no conflicts of interest.

References

1. Esteghamati A, Khalilzadeh O, Mohammad K, Meysamie A, Rashidi A, Kamgar M, *et al.* Secular trends of obesity in Iran between 1999 and 2007: National Surveys of Risk Factors of Non-communicable Diseases. *Metab Syndr Relat Disord* 2010;8:209-13.
2. Kolahi AA, Moghisi A, Soleiman Ekhtiari Y. Socio-demographic determinants of obesity indexes in Iran: Findings from a nationwide STEPS survey. *Health Promot Perspect* 2018;8:187-94.
3. Shojaei M, Sotoodeh-Jahromi A, Rahmanian K, Madani A. Gender differences in the prevalence of cardiovascular risk

- factors in an Iranian urban population. *OnLine J Biol Sci* 2015;15:178-84.
4. Abdelaal M, Le Roux CW, Docherty NG. Morbidity and mortality associated with obesity. *Ann Transl Med* 2017;5:161.
 5. Wang Z, Peng Y, Liu M. Age variation in the association between obesity and mortality in adults. *Obesity (Silver Spring)* 2017;25:2137-41.
 6. Rahmanian K, Shojaie M. The prevalence of pre-hypertension and its association to established cardiovascular risk factors in south of Iran. *BMC Res Notes* 2012;5:386.
 7. Rahmanian K, Shojaei M, Sotoodeh Jahromi A, Madani A. The association between pre-diabetes with body mass index and marital status in an Iranian urban population. *Glob J Health Sci* 2015;8:95-101.
 8. Cuzmar V, Alberti G, Uauy R, Pereira A, García C, de Barbieri F, *et al.* Early obesity: Risk factor for fatty liver disease. *J Pediatr Gastroenterol Nutr* 2020;70:93-8.
 9. Emerenziani S, Guarino MP, Trillo Asensio LM, Altomare A, Ribolsi M, Balestrieri P, *et al.* Role of overweight and obesity in gastrointestinal disease. *Nutrients* 2019;12 (1): 111. doi:10.3390/nu12010111.
 10. Rahmanian K, Shojaei M, Sotoodeh Jahromi A. Prevalence and clinical characteristics of metabolically unhealthy obesity in an Iranian adult population. *Diabetes Metab Syndr Obes* 2019;12:1387-95.
 11. Victorzon M, Tolonen P, Sintonen H. Health-related quality of life in severely and morbidly obese patients waiting for bariatric surgery in Finland. *Scand J Surg* 2010;99:122-6.
 12. Ooi DS, Loke KY, Ho CW, Lim YY, Tay V, Karupiah V, *et al.* Self and parent-proxy rated health-related quality of life (HRQoL) in youth with obesity: Are parents good surrogates? *Qual Life Res* 2020; 29(8): 2171-2181.
 13. Chang CY, Hung CK, Chang YY, Tai CM, Lin JT, Wang JD. Health-related quality of life in adult patients with morbid obesity coming for bariatric surgery. *Obes Surg* 2010;20:1121-7.
 14. de Zwaan M, Petersen I, Kaerber M, Burgmer R, Nolting B, Legenbauer T, *et al.* Obesity and quality of life: A controlled study of normal-weight and obese individuals. *Psychosomatics* 2009;50:474-82.
 15. Tsai AG, Wadden TA, Sarwer DB, Berkowitz RI, Womble LG, Hesson LA, *et al.* Metabolic syndrome and health-related quality of life in obese individuals seeking weight reduction. *Obesity (Silver Spring)* 2008;16:59-63.
 16. Anandacoomarasamy A, Caterson ID, Leibman S, Smith GS, Sambrook PN, Fransen M, *et al.* Influence of BMI on health-related quality of life: Comparison between an obese adult cohort and age-matched population norms. *Obesity (Silver Spring)* 2009;17:2114-8.
 17. Bullinger M. German translation and psychometric testing of the SF-36 health survey: Preliminary results from the IQOLA Project. *International Quality of Life Assessment. Soc Sci Med* 1995;41:1359-66.
 18. Montazeri A, Goshtasebi A, Vahdaninia M, Gandek B. The Short Form Health Survey (SF-36): Translation and validation study of the Iranian version. *Qual Life Res* 2005;14:875-82.
 19. Fontaine KR, Barofsky I. Obesity and health-related quality of life. *Obes Rev* 2001;2:173-82.
 20. Pimenta FB, Bertrand E, Mograbi DC, Shinohara H, Landeira-Fernandez J. The relationship between obesity and quality of life in Brazilian adults. *Front Psychol* 2015;6:966.
 21. Kortt MA, Dollery B. Association between body mass index and health-related quality of life among an Australian sample. *Clin Ther* 2011;33:1466-74.
 22. Carpiniello B, Pinna F, Pillai G, Nonnoi V, Pisano E, Corrias S, *et al.* Psychiatric comorbidity and quality of life in obese patients. Results from a case-control study. *Int J Psychiatry Med* 2009;39:63-78.
 23. Medhi GK, Sarma J, Bhattacharyya H, Pala S, Visi V, Bora PJ. Sociodemographic variations in health-related quality of life (HRQOL) among elderly individuals in an urban locality in India. *J Family Med Prim Care* 2019;8:2473-7.
 24. Metz U, Welke J, Esch T, Renneberg B, Braun V, Heintze C. Perception of stress and quality of life in overweight and obese people – Implications for preventive consultancies in primary care. *Med Sci Monit* 2009;15:PH 1-6.
 25. Doll HA, Petersen SE, Stewart-Brown SL. Obesity and physical and emotional well-being: associations between body mass index, chronic illness, and the physical and mental components of the SF-36 questionnaire. *Obes Res* 2000;8:160-70.
 26. Franquelo-Morales P, Sánchez-López M, Notario-Pacheco B, Miota-Ibarra J, Lahoz-García N, Gómez-Marcos MÁ, *et al.* Association between health-related quality of life, obesity, fitness, and sleep quality in young adults: The cuenca adult study. *Behav Sleep Med* 2018;16:347-55.
 27. Slagter SN, van Vliet-Ostaptchouk JV, van Beek AP, Keers JC, Lutgers HL, van der Klauw MM, *et al.* Health-related quality of life in relation to obesity grade, type 2 diabetes, metabolic syndrome and inflammation. *PLoS One* 2015;10:e0140599.