The Mediating Role of Self-Compassion in the Relationship Between Family Cohesion, Stress, and Quality of Life with Body Mass Index in Adolescent Girls

Laleh shamsyousefi[1] , Farahnaz Meschi[*1] , Sheida Sodagar[2] , Zohreh Rafezi[3] , Mohammad Reza Seirafi[1]

Abstract

Objective: Being overweight and obese in adolescence is associated with severe health effects during their lifetime The purpose of this study was to explain the mediating role of self-compassion in the relationship between family cohesion, stress, and quality of life with body mass index in adolescent girls

Method: The current research was descriptive-multiple linear regression From among the statistical population of the research, 250 teenage girls were selected as the research sample using a multi-stage cluster sampling method, and finally, after dropping 50 people from the sample group, the data of 200 of them were analyzed. The tools of data collection included the Samani Family Cohesion Questionnaires (2001), Byrne and Mazano Stress (2002) Scale, the World Health Organization Quality of Life (1996) questionnaire, and the NAF Self-compassion (2003) inventory. For data analysis, structural equation modeling was performed using SPSS26 and AMOS24 software.

Results: The results showed that the model of body mass index based on the quality of life, family cohesion, and stress with the mediating role of self-compassion has a good fit. It also indicated that family cohesion, stress, and quality of life did not predict body mass index in adolescent girls, But quality of life predicts body mass index in adolescent girls.

Conclusion: It seems that self-compassion plays a mediating role in the relationship of body mass index with family cohesion, stress, and quality of life in adolescent girls.

Keywords: Stress, Family cohesion, Self-compassion, Body mass index, Quality of life.

Introduction

Being overweight and obese in adolescence is associated with severe health effects during their lifetime. Body mass index (BMI) is the most widely used formula for evaluating and measuring obesity and physical health. Body mass index is an index by which a person's weight can be measured concerning height, and it is one of the criteria that can be used to show overweight and obesity. Evidence has shown that the death rate increases in people with a body mass index of less than 20 and more than 30. With this index, it is possible to calculate the amount of overweight or even weight loss in people (Mirhasani, Sharif-Niya, Etebarian Khorasgani & Qanbari-Khanqah, 2020). Body mass index is a statistical measurement to compare the weight and height of a person. Indeed, this measurement does not measure the degree of obesity, but it is a suitable tool to estimate the health of a person's weight according

1. Department of Health Psychology, Karaj Branch, Islamic Azad University, Karaj, Iran.
2. Department of Health Psychology، Karaj Branch، IslamicAzad University،Karaj، Iran
3. Department of Psycholog,Tehran Branch, Allameh Tabataba'i University, Tehran, Iran
*Corresponding Author: Farahnaz Meschi, Email: fa_meschi@ yahoo.com

to her height. Body mass index is only a simple and superficial measure that only shows our weight status, and even though it determines the amount of fat in our body in a certain way, it does not state the distribution of fats and the differentiation between fat and muscle (Gholamian Eliato, 2020). This index is used to calculate extra weight by dividing the person's weight (in kilograms) by the square of the height (in meters). It is said that a body mass index equal to 18.5 to 24.9 indicates normal and healthy weight, between 29.9 and 25 as overweight, between 30 and 35 as obesity, between 35 and 40 as severe obesities, and a body mass index above 40 as morbid obesities, which is associated with increased risk (Fruh, 2017).

In this regard, one variable related to body mass index is family cohesion, which is defined as the emotional closeness between family members and the commitment of members and spending time together, which are its two main elements. Emotional support and respect for each other are also implied in this term, which exists among family members at different levels. In cohesive families, situations that lead to a problem or conflict are resolved with the cooperation of members and even if possible in logical ways (Santos, Crespo, Canavarro & Kazak, 2017). Family cohesion is one of the components of family functioning and can be defined as an emotional bond between family members and a degree of individual independence that a person experiences in the family system, which shows a level of solidarity between family members (Olson, Russell & Sprenkle, 2015). Family cohesion includes the emotional bond between family members and the degree of independence experienced by individuals within the family. The protective factor of family cohesion against distress and discomfort is considered a function of close family relationships, sharing the feeling of loyalty, reciprocity, and solidarity among its members. With higher family

cohesion, the relationship between individuals and their families becomes more pleasant and harmonious. As it was mentioned, the joyfulness the family brings to the family helps the members reduce their fear. In addition, closeness and love among family members can broaden one's thoughts, which can avoid paying too much attention to negative information (negative information that increases negative emotions, for example, fear). Also, the higher the level of family cohesion, the greater the frequency of communication between individuals and their families (Siri & Siri, 2016).

Another variable that is related to body mass index, in addition to family cohesion, is stress. Stress is generally considered an unpleasant state (a negative emotional experience) associated with chemical changes in the physical, psychological, and behavioral aspects of an individual. Stress is the result of a person's evaluation process of stressful and tense experiences in the environment. In other words, stress is a pressure imposed on a person from outside and is associated with physical, mental, and behavioral discomforts. When the problems faced by a person are higher than that person's coping power, adaptability, and ability, the person experiences stress or psychological pressure (Ross & Altmayer, translated by Gholamreza Khawajepour, 2017), and is defined as a reaction to compromise with the factor or conditions that put mental or physical pressure on a person. In this situation, under the influence of stressful external stimuli, the person leaves the normal condition and unconsciously attempts to adapt herself to the said stimuli. The reactions resulting from this effort are shown as stress (Waziri, 2020). When the environmental needs, whether internal or external, real or imagined, are more than a person's capacity, stress causes psychological and biological changes that put a person at risk of disease. Also, stress is a reaction a person makes against external pressures or improper

conditions, and anxiety is one of its common side effects (Karimi, Bahadori, Khalkhali & Rabieipour, 2017).

In addition to family cohesion and stress, quality of life can also be associated with body mass index. Quality of life is deeply rooted in the way of thinking about health. In this regard, there is no single viewpoint on its causes and effects, as health has been considered an indicator of livability in different models, and in other models of environmental quality acts as a health determinant (Hakiminiya, Pourafkari, & Ghafari, 2017), and in some sense, expresses the situation of people living in a country or region. Early theories related to the quality of life emphasized more on individual concerns and priorities, but in recent years, theoretical discussions have changed from individual-centered towards social concerns such as security, freedom, the extent of the quality of life, and the structure and quality of social relationships of people in the society ((Baskha, Agheli-Kohneshahri, & Masaeli, 2010). According to the definition by the World Health Organization, quality of life is people's understanding of their position in life in terms of culture, the value system in which they live, and their goals, expectations, standards, and priorities. So, it is a subjective issue that cannot be observed by others and is based on people's understanding of different aspects of their lives. According to the World Health Organization, people's quality of life is evaluated in terms of four dimensions including physical health, mental health, social relations and communication, and environmental health. Mental health includes a person's satisfaction and perception of herself and her appearance, positive and negative emotions, self-confidence, spiritual beliefs, and memory and concentration (Hakiminiya, Pourafkari, & Ghaffari, 2017).

Another variable under investigation is self-compassion. It is a structure consisting of three bipolar components: self-kindness versus self-criticism, shared human feelings versus isolation, and mindfulness versus magnification (Hajjian, Sadeghi, & Mogamiyan, 2020). Unlike self-criticism, self-kindness can be seen as one of the emotion regulation strategies in which unpleasant emotions are not ignored or suppressed, rather, feelings are accepted compassionately (Fassijani, Ebrahimnejad Moghadam, & Molhi, 2021). "Self-compassion" is a structure rooted in Buddhist philosophy, which sees a person's personal experiences as normal human experiences, accepts suffering, failure, and incompetence as a part of the human condition, and considers all human beings worthy of compassion. Although Western psychologists have spent a lot of time in their empirical work investigating empathy and compassion for others, "self-compassion" has recently been investigated. In Buddhist psychology, compassion means paying attention to one's and others' suffering. Compassion involves sensitivity to the experience of suffering associated with a strong desire to relieve it. This point means that to experience compassion, you must first acknowledge the existence of pain (Germer & Neff, 2019). Psychologists believe that compassion means paying attention to the suffering and trying to reduce it. This suffering may exist within the individual or in other members of society. Instead of making value criticizing, compassionate people simply pay attention to the suffering and take steps to alleviate it. It can be assumed that in compassion, there is no critical look or judgment (Balat, translated by Barzegarbfaroui, Aboie & Aboie, 2020).

Regarding the relationship between the body's mental image and mental health, there have been numerous studies. For instance, Rezazadeh Sharma (2021) in research titled "Investigating the relationship between body mass index and body mental image with mental health in adolescent girls of the first secondary level of Mazandaran province"

concluded that there was no significant relationship between body mass index and mental health in this study. Also, there was not a significant relationship between attitude toward weight and mental health. However, there was a negative and significant relationship between the satisfaction of different parts of the body and general health and all its dimensions. Also, the results of the regression analysis showed that the dimensions of the mental image of the body explain about 20% of the variance of general health. In the research of Qazvini and Kayani (2018) on the relationship between body mass index and perceived stress and the quality of life with health comparing male and female adolescents, the results showed that the implementation of stress management interventions and improving the quality of life-related to health can be effective in preventing obesity and overweight of students. Also, an investigation conducted by Kachoui, Hassani, Moradi, and Fathi-Ashtiani (2018) on comparing mindfulness and self-compassion in women with high and normal body mass index showed that mindfulness and self-compassion in people with high body mass index were less than normal weight people. This psychological construct should be considered in therapeutic interventions. Another research was carried out by Narimani, Samadi Fard, Sadeghi, and Sadeghi (2017) on the relationship between self-compassion and the quality of life among spouses in Ardabil city. Its results showed a significant relationship between self-compassion and the quality of life of spouses. We can conclude from this study that spouses with higher levels of self-compassion have a more favorable quality of life. Nasiri Zarin-Qabaei, Taleb-Pour Amiri, Hosseini Waleshkalii, and Rajab-Zadeh (2016) in research titled "Quality of Life and its Relationship with Job Stress in nurses working in Sari Hospitals" reached the results that the majority of research samples, with a frequency of 2.62%, had an average quality of life. Also, the mean and standard deviation of job stress was estimated at 02.115±20.94, indicating high stress in nurses. There was a significant relationship between the general dimension of physical health and mental health with all dimensions of job stress, except for the subscale of control and support from officials. Also, there was a statistically significant relationship between gender and work system with quality of life and between age, background, marital status, and work system with job stress. In the research of Zare, Mahmoudi, and Samani (2011) under the title of the relationship between family cohesion and Quality of life with the happiness of primary school teachers in Maroodasht city, the results showed that there is a positive relationship between family cohesion and two dimensions of physical health and mental health, quality of life and family cohesion and happiness, and also between different dimensions of quality of life and happiness. Using multiple regression analysis, the prediction of happiness by family cohesion and quality of life was investigated simultaneously. The results showed that all four dimensions of quality of life were positive predictors of happiness. However, family cohesion did not have such strength.

In research entitled "The effect of psychological resources on body mass index in bariatric surgery volunteers", Robitzsch et al. (2020) found that it seems that psychological resources are related to bariatric surgery. Good psychological resources show possible associations with less depression and better eating behavior. Also, research conducted by Lucretia Pop (2018) on the relationship between body mass index and body image anxiety in a sample of undergraduate students showed that 79% of the girls had problems accepting their body image, and even 87.7% of the subjects were in the normal and underweight category. A strong and significant correlation was found between body mass index

and body image anxiety. It is acceptable to consider body mass index values as useful predictors of the risk of body dissatisfaction in young women. Through physical training, they gain self-confidence and positive body consciousness and reduce anxiety related to physical appearance. In the research of P Mendes, Crespo & Austin (2017) under the title of examining the mediating role of stigma on the relationship between family cohesion and quality of life in children with epilepsy and their parents, the results showed that it explains 43 and 35 percent of the consequences of the quality of life of children and parents, respectively. Family cohesion was directly related to the quality of life consequences for children and parents and indirectly only for children through negative associations with perceived stigma. At the dual level, parents' perception of family cohesion was positively related to children's health-related quality of life. Routine screening of patients experiencing a poorer health-related quality of life should include an assessment of family relationships

and stigma. The increase in body mass index is associated with the advancement of technology and socio-economic factors. It is fully documented that this phenomenon, regardless of the region in the world, is associated with more issues and is one of the limiting factors in the health of human society. Obesity by the accumulation of fat in the body leads to important diseases, such as diabetes, high blood pressure, blood fat, cardiovascular diseases, insomnia, and different cancers. Therefore, it is recognized as a fundamental problem in public health that requires immediate attention and consideration to prevent health and psychological consequences related to obesity.

Therefore, problems and issues related to high body mass index are not limited to medical and physical issues, rather, since the negative attitude towards this variable is also expanding in developing societies, it has a profound effect on the risk of psychological, behavioral, and emotional problems such as body
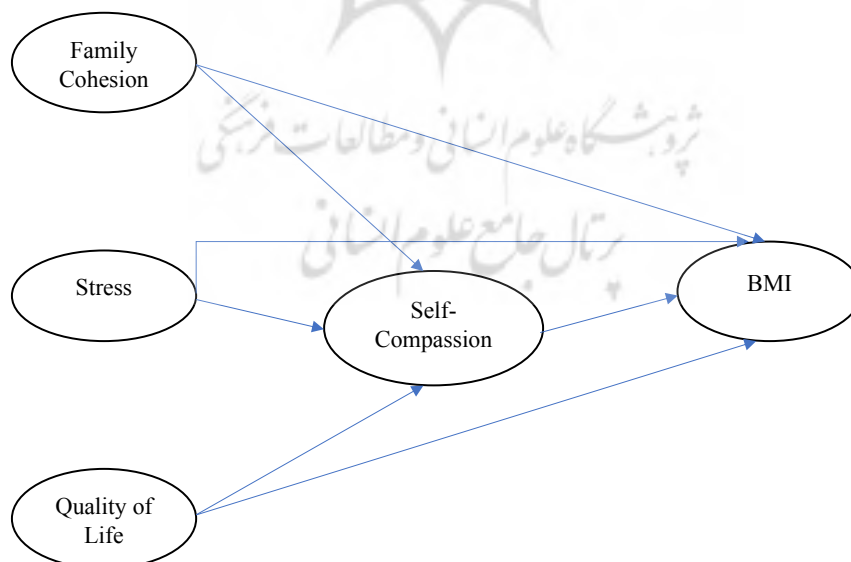
Figure-1: Research Model-The Mediating Role of Self-Compassion in the Relationship Between Family Cohesion, Stress, and Quality of Life with Body Mass Index

image dissatisfaction, social anxiety, low self-efficacy, adjusting interpersonal relationships, despair, and low functional capacity in obese adolescents, and some way, it causes worry about the future, stress, and weakening the life satisfaction. Therefore, attention and following up the body mass index and expansion of effective psychological interventions such as familiarizing parents and adolescents with the risks of this epidemic phenomenon, family efficiency, and its cohesion in raising the quality of life of children, and creating motivation and having a positive view of self-knowledge and evaluation and existential dimensions, the degree of growth and flourishing of their talents and self-acceptance, as preventive measures, are effective on individual-social empowerment and public health. Hence, according to the above-mentioned, the current research aimed to answer this question: Does self-compassion play a mediating role in predicting body mass index based on family cohesion, stress, and quality of life in adolescent girls?

Method

In terms of the practical purpose and data collection, the current research is descriptive - multiple linear regression through AMOS structural equations. The statistical population of this research included 250 female students from schools in Tehran in 1400, of which 50 samples were excluded from the research due to the incompleteness of the questionnaire, and considering that the sample size above 200 was reported to be suitable in modeling and considering each variable. The subject investigated in this research and the number of hidden factors related to it, the sample size was 200 people. Descriptive statistics of their age, height, weight, and body mass index (BMI) were analyzed and they were evaluated in three categories: underweight, normal, and overweight. By using the cluster sampling method,

five geographical regions were considered from the 22 regions of Tehran. Then from each region, three education regions and three schools were randomly selected, from each of which two classes were randomly selected, and all students of those two classes were considered as the study samples. These steps lasted for 3 months with the coordination of school administrators.

The Inclusion and exclusion criteria: The inclusion criteria included 1- Parental consentand submitting the code of research ethics IR.IAU.K.REC1400.070 2- female students aged 12 to 18, 3- reading and writing literacy, and 4- residency in Tehran province. The exclusion criteria were 1- having certain diseases, 2- taking medicine, and 3- unwillingness to cooperate in the research. The researcher used four standard questionnaires as research tools.

Measures

1- The Samani Family Cohesion Scale: This scale was developed in 2002 inspired by Elson's (2000) mixed model and compiled based on the review of existing literature on cohesion. This scale consists of 28 items and the answers to each item are scored based on a five-point Likert scale from 1= completely disagree to 5 + completely agree. Razavieh and Samani (1980) evaluated this scale based on eight factors (correlation with parents, duration of interaction, location, decision-making, emotional connection, marital relations, and parent-child relationship) and confirmed the appropriateness of this tool to evaluate family cohesion. This scale provides a total score ranging from 28 (the minimum) to 140 (the maximum). The higher scores indicate greater family cohesion. In Samani's research (2002), the reliability coefficient of this questionnaire was reported as 0.79 by Cronbach's alpha method and 0.90 by the test-retest. Also, Zare and Samani (2008) reported the reliability of this tool as 0.80 with a sample of 30

people and with a test-retest method after one week.

2- Adolescent Stress Questionnaire (ASQ): It was developed by Byrne and Mazzano (2002) with 56 questions that reflect 10 dimensions of stress over at least 12 months: 1- Home life, 2- School performance stress, 3- School-related stress, 4- Romantic relationships, 5- Peer pressure, 6- Relationships with teachers, 7- Uncertainty about the future, 8- Contradiction between homework and enjoyable activities, 9- Financial pressure, and 10- The emergence of adult responsibilities. A five-point Likert scale (5= stress to 1= extremely stressful) is used to score the questionnaire. The score of each scale is calculated based on the answers to each item, and the total score is obtained based on the set of responses to each dimension. The reliability of the test was obtained by Bern et al. (2007) using Cronbach's alpha method for components between 62 and 92. Also good retest for all The components were obtained. In Iran, this test was standardized by Beshrpour et al. (2012) on 157 high school students of Ardabil city in the academic year 2010-2012. Its total score is between 56 and 280, and the compatibility of its items with Cronbach's alpha was 97.

3- Quality of Life Assessment: This questionnaire is a shortened version of the WHOQL-100 questionnaire developed by the World Health Organization in 1996, entitled OQL01-BREF. This scale has 25 questions and measures four dimensions of people's quality of life: mental health, physical health, living environment, and social relations. Seven items measure physical health, six items measure mental health, five items assess social relations, and eight items measure the living environment. The scoring of the questionnaire is based on a 5-point Likert scale ranging from very good (5), good (4), neither good nor bad (3), bad (2), and very bad (1). Questions 3, 4, and 25 are scored in reverse. The overall score of each respondent is the sum of the answers to each

item, ranging from 25 (the minimum score) to 130 (the maximum score), with higher scores indicating better quality of life. This scale was translated into Persian by Nasiri in 2006. The World Health Organization's quality of life scale creators group reported the reliability of the scale in a study on 15 international centers of this organization between 0.73 and 0.89 for the four subscales and the whole scale, respectively.

4- Self-Compassion Scale (SCS): This self-report instrument is a 26-item scale developed by Neff in 2003 to measure the degree of self-compassion and is scored on a Likert scale from 1 (rarely) to 5 (almost always). It measures three bi-lateral components in the form of six subscales: 1- self-kindness versus self-critical, 2- common human feelings versus isolation, and 3- mindfulness versus magnification, which measures the quality of one's relationship with the previous experiences – for example, how much a person is compassionate with herself (not criticizing), how much she sees her experiences as a part of others', and how much she refrains from exaggerating her own experiences. Thus, this scale specifies the perspective of openness to issues and the feature of wide consciousness, which is the second form of mindfulness. The total self-compassion is obtained by summing the mean scores of six components. High validity and reliability for the scale have been reported at 0.92 using Cronbach's alpha formula. The validity of the questionnaire was confirmed by experts, and the reliability of the questionnaires was calculated using Cronbach's alpha coefficient (family cohesion = 0.61, stress = 0.97, quality of life = 0.91, body image concerns = 0.89, and self-compassion = 0.87). For data analysis, descriptive statistics (mean, standard deviation, and median) and inferential statistics (Kolmogorov Smirnov and structural equations) were performed using SPSS version 24 and AMOS software.

The results of data analysis using SPSS version

26 and Amos software 24 are presented in two parts: descriptive and model analysis findings. In the descriptive section, the results of the mean, standard deviation, minimum and maximum of the demographic indicators, and the research variables of the subjects are provided. In the section of the model analysis, after checking the assumptions using Pearson's parametric correlation test and structural equations, the results of the testing hypotheses are given.

Ethical Statement

In the current research, the researchers have considered themselves obliged to comply with the following ethical principles:

1- The freedom of people to participate in the research.

2- Giving a brief explanation about the purpose of the research and how to answer the questionnaire to the volunteers.

3- Providing necessary detailed explanations before starting the research to the subjects about how to conduct the research tools as explained in the questionnaires.

4- Reassuring the subjects to keep personal information confidential.

This study was conducted under the research ethical code IR.IAU.K.REC1400.070.

Results

descriptive statistics

In the descriptive section, the results showed that the subjects ' age was between 12 and 24 years, with a mean of 15.34 years. Their height was between 142 and 185 cm, their weight was between 30 and 100 kg, and the mean of their body mass index was 21.06, with the lowest and highest body mass index of 12.66 and 33/80, respectively.

Normality of the data

To check the normality of the variables in the research, Kolmogorov Smirnov was used, and the results showed that the skewness and stretch indices of all the variables did not exceed ±2. According to Garson (2003; cited by Klein, 2016), the skewness and stretch indices should be between +2 and -2 for data to be normally distributed at the 0.05 level. Therefore, it can be said that the distribution of data for each research variable was normal.

Inferential statistics

Main hypothesis: Self-compassion acts as a mediating role in predicting body mass index based on family cohesion, stress, and quality of life in adolescent girls.

Table 1. Fit indices of the research model

Fit limit		Model	Index
Excellent	Acceptable		
<3	<5	2.033	c2/df
<.05	<.08	0.072	RMSE
>.95	>.9	0.945	GFI
>.95	>.9	0.964	CFI

The results of Table 1 show that in the model, the values of goodness-of-fit indices χ^2/df and CFI are at an excellent level, and the values of RMSE and GFI are at an acceptable level. Therefore, it was concluded that the prediction model of body mass index based on family cohesion, stress, and quality of life with the mediating role of self-compassion in adolescent girls is a good fit.

Sub-hypothesis 1: Family cohesion predicts body mass index with the mediation of self-compassion in adolescent girls.

The results of Table 2 show that the standard coefficient (-0.005) of the indirect path between family cohesion and body mass index is not significant at a significance level of more than 0.05.

Table 2. Total, direct, and indirect path coefficients between variables of family cohesion and body mass index with the mediation of self-compassion

Path	Direct		Indirect		Total	
	B	Sig	β	Sig	β	Sig
Family cohesion → Body mass index	-0.191	0.272	-0.005	0.931	-0.196	0.166
The apparent positive pole of self-compassion → Body mass index	0.240	0.007			0.240	0.007
The apparent negative pole of self-compassion → Body mass index	0.118	0.387			0.118	0.387
Family cohesion → the apparent positive pole of self-compassion	-0.009	0.888			-0.009	0.888
Family cohesion → the apparent negative pole of self-compassion	-0.024	0.961			-0.024	0.961

Therefore, in testing the first hypothesis, it was concluded that family cohesion does not predict body mass index through the mediation of self-compassion in adolescent girls.

Sub-hypothesis 2: Stress predicts body mass index with the mediation of self-compassion in adolescent girls.

The results of Table 3 show that the standard coefficient (0.039) of the indirect path between mental pressure or stress and body mass index is not significant at a significance level of more than 0.05. Thus, in testing the second hypothesis, it was concluded that psychological stress does not predict body mass index through the mediation of self-compassion in adolescent girls.

Sub-hypothesis 3: Quality of life predicts body mass index through the mediation of self-compassion in adolescent girls.

The results of Table 4 show that the standard coefficient (-0.343) of the indirect path between quality of life and body mass index is not significant at a significance level of more than 0.05. Thus, in the third hypothesis test, it was concluded that quality of life does not predict body mass index through the

Table 3. Total, direct, and indirect path coefficients between variables of stress and body mass index with mediation of self-compassion

Path	Direct		Indirect		Total	
	B	Sig	β	Sig	β	Sig
Stress → body mass index	-0.013	0.880	0.039	0.559	0.025	0.701
The apparent positive pole of self-compassion → body mass index	0.240	0.007			0.240	0.007
The apparent negative pole of self-compassion → body mass index	0.118	0.387			0.118	0.387
Stress → the apparent positive pole of self-compassion	-0.050	0.531			-0.050	0.531
Stress → the apparent negative pole of self-compassion	0.430	0.011			0.430	0.011

Table 4. Total, direct, and indirect path coefficients between quality of life and body mass index variables with the mediation of self-compassion

Paths	Direct		Indirect		Total	
	B	Sig	β	Sig	β	Sig
Quality of life → body mass index	-0.343	0.088	0.059	0.377	-0.284	0.088
The apparent positive pole of self-compassion → body mass index	0.240	0.007			0.240	0.007
The apparent negative pole of self-compassion → body mass index	0.118	0.387			0.118	0.387
Quality of life → the apparent positive pole of self-compassion	0.435	0.005			0.435	0.005
Quality of life → the apparent negative pole of self-compassion	-0.384	0.011			-0.384	0.011

mediation of self-compassion in adolescent girls. Sub-hypothesis 4: Family cohesion predicts body mass index in adolescent girls. The results in Table 2 show that the standard coefficient (-0.191) of the direct path between family cohesion and body mass index is not significant at a significance level of more than 0.05. Therefore, in testing the fourth hypothesis, it was found that family cohesion does not predict body mass index in adolescent girls. Sub-hypothesis 5: Stress predicts body mass index in adolescent girls. The results of Table 3 show that the standard coefficient (-0.013) of the direct path between mental pressure or stress and body mass index is not significant at a significance level of more than 0.05. Thus, in the test of the fifth hypothesis, it was concluded that mental stress does n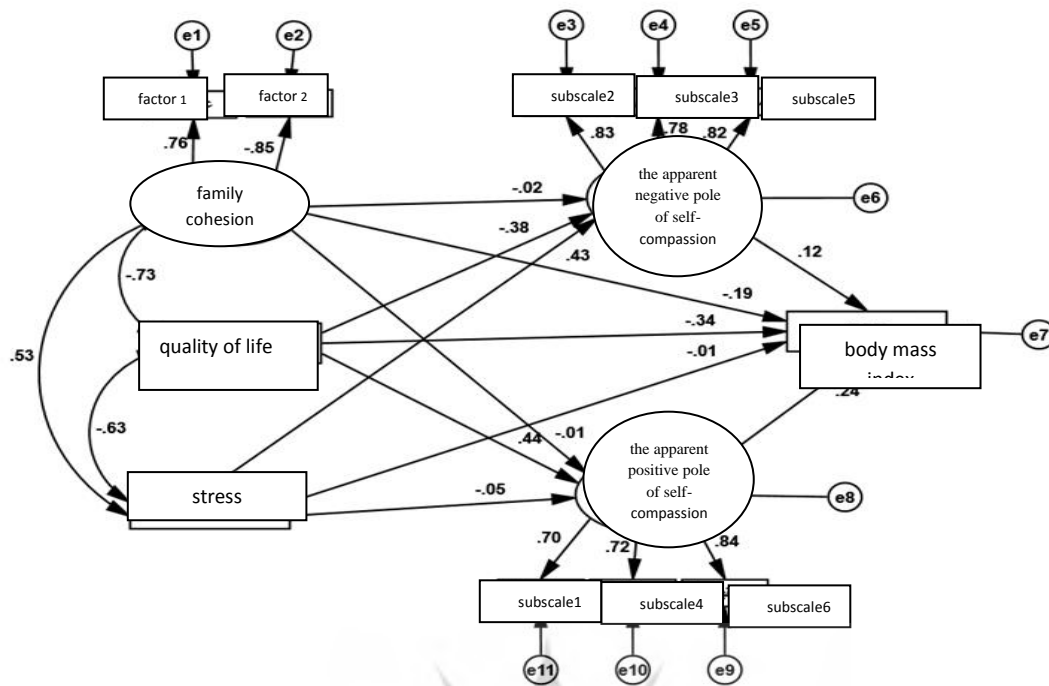ot predict body mass index in adolescent girls. Sub-hypothesis 6: Quality of life predicts body mass index in adolescent girls. The results of Table 4 show that the standard coefficient (0.059) of the direct path between quality of life and body mass index is not significant at a significance level of more than 0.05. Thus, in the test of the sixth hypothesis, it was concluded that the quality of life does not predict body mass index in adolescent girls.

In order to investigate the main purpose of the research, the following model (Figure 1) has been designed; which shows the direct effect and the indirect effect of the quality of life variable, family cohesion variable, and stress variable on the Body Mass Index variable. It should be noted that the self-compassion variable (mediator variable) is considered as apparent positive and negative poles.

Discussion and Conclusion

In examining the main hypothesis, the findings showed that the prediction model of body mass index based on quality of life, family cohesion, and stress with the mediating role of self-compassion in adolescent girls is a good fit. This result is in line with the results of the research of Rezazadeh Sharma (2021), Qazvini and Kiani (2018), S. Aloya, and

Figure 2: Body mass index prediction model based on quality of life, family cohesion, and stress with the mediating role of self-compassion in adolescent girls

Strozenberg (2020), Lucretia Pop (2018), Cortney and Chavez (2022), Harbaleh and Dudin (2021). In explaining the above result, it can be said that adolescence is the age of idealism, and these young people often think a lot about their body appearance and compare their body appearance with others. When they feel good about their body, they are more likely to have higher self-esteem and can balance their physical activity and nutrition. But adolescent girls who don't like their bodies often want to lose weight and become slim. For this reason, adolescent girls have diverse body mass indexes such as low body mass index, normal body mass index, overweight body mass index, and dangerous body mass index. Meanwhile, adolescents who have a higher level of self-compassion usually benefit from mindfulness, a sense of human sharing, and self-compassion, are more efficient in balancing emotions, and use more adaptive strategies in dealing with obesity.

The findings also showed that family cohesion does not predict body mass index through the mediation of self-compassion in adolescent girls. The result is consistent with the findings of Zare et al. (2019) and Zink et al. (2021). In explaining it, it can be said that being overweight and obese in all people, especially adolescents, causes some physical and even mental problems. On the other hand, the part of fat accumulation in the body is also vital. Visceral fat around the organs, even in teenagers, is much more dangerous to health than the same amount of fat spread evenly throughout the body. However, to obtain the ideal weight in terms of height, the body mass index should be calculated based on the metric unit. Meanwhile, adolescents who are obese in families with cohesion, in addition to positive acceptance of each other, support each other to reach the ideal weight. Among them are obese teenagers who live in cohesive families. Children in such families gradually learn how to

solve problems, like obesity, logically with the support of the family. Therefore, along with the feeling of being supported, they find a sense of independence and self-esteem to effectively deal with problems. Since self-compassion requires a conscious awareness of one's emotions and having a compassionate attitude towards oneself requires adopting a balanced psychological perspective called awareness, in self-compassion practices, body relaxation, mental relaxation, and mindfulness, which play an important role in peace of mind and negative spontaneous thoughts against obesity, are emphasized.

In the investigations carried out, the findings showed that psychological stress does not predict body mass index through the mediation of self-compassion in adolescent girls. The obtained result is in line with the research of Qazvini and Kayani (2018), Rabitz et al. (2020), and Lucretia Pope (2018). In explaining the above result, it can be said that adolescents with obesity show disorders in various cognitive tasks. In this way, disorders related to depression are observed in tasks used to measure overt memory, verbal fluency, behavioral regulation, psycho-motor speed, change of cognitive signs (sets), persistence, and attention. It seems that obesity, in addition to the physiological problems it causes, has psychological consequences such as anxiety and depression. Even some adolescents suffer from overeating due to psychological pressure, which leads to excessive obesity in them. In the meantime, self-compassion, which includes three areas (creating kindness, awareness of one's emotions, and self-compassion as a result of training), by being kind to oneself, has caused people to treat themselves with kindness instead of judging their bodies. Mindfulness of one's emotions helps people see their bodies in a more balanced way without exaggerated perceptions. Also, self-compassion as a result of training helps

people to see the bigger image with a more open view. Self-compassion requires accepting that suffering, failure, and inadequacies are a part of human conditions and that all human beings, including the individual herself, deserve kindness and compassion.

The obtained results indicate that the quality of life does not predict body mass index through the mediation of self-compassion in adolescent girls. The result is consistent with the results of Qazvini and Kayani (2017), S. Alaya, and Strozenberg (2020), and Pi-Mendez et al. (2017). In explaining this result, it can be said that quality of life has an effective role in overweight and obesity among adolescents. In terms of the negative impact on the psychological dimension of the quality of life, obese adolescent experiences a kind of mental disturbance, which causes their internal balance to be affected and they cannot have their own normal mental life like people who are not obese or overweight. One of the emotions that cause or aggravate this mental disorder is the feeling of shame. It seems that obesity and its negative physical, psychological, and social consequences could cause a person to choose an environment for his/her life that either does not have the necessary centrality to receive health services or, because of the experience of a kind of social fear that an obese person suffers over time, prefers isolation. At this point, self-compassion affects reducing the fear of obesity. In other words, self-compassion helps teenagers to have a greater sense of belonging and security and distance themselves from their critical and judgmental minds by learning mindfulness and being in the present moment, which leads to well-being and a better quality of life. Since being kind to oneself and feeling connected can increase awareness if a teenager stops judging and blaming oneself and experiences self-acceptance to a sufficient extent,

the negative effect of emotional experiences will decrease, and maintaining a balanced awareness of thoughts and emotions becomes easier.

The findings also showed that family cohesion does not predict body mass index in adolescent girls. This result was in line with the research results of Zare et al. (2011) and Zink et al. (2021). In explaining the result, we can say that obesity causes many problems in adolescents, which may show its consequences not in the short term but in adulthood. Problems such as diabetes, high blood pressure, and high cholesterol that start at a young age and continue into adulthood are only some of the most common complications of childhood obesity. Many obese adolescents remain obese into adulthood, especially if one or both parents are obese. Adolescent obesity may cause low self-confidence and depression. Therefore, the family must support their obese child so that they can be more active and make healthy changes in their diet. Informing teenagers about their overweight can be the first step in this way. In the meantime, the existence of family cohesion, or in other words, the feeling of belonging to the family, by other possible variables such as low-value food consumption, can cause obesity. General satisfaction, progress, and adventure can also be associated with more tendency towards peers and overeating and common sedentary behaviors among them. Having negative emotions in adolescent girls can have a mechanism similar to stress.

The results also demonstrated that mental stress does not predict body mass index in adolescent girls. The obtained result is similar to Rabitz et al.'s (2020) and Lucretia Pope's (2018) results. In explaining the findings, we can conclude that obese people under psychological pressure, usually eat more. However, a scientific study shows that this is not true for adolescents, and they prefer to eat less in stressful situations. However, chronic stress increases the risk of being overweight and obesity in them. Adolescents who are stressed indulge in high-calorie foods such as chocolate, ice cream, and other snacks. Stress may also increase the risk of sleep deprivation and substance abuse, which leads to obesity. Therefore, not being able to control eating and not doing regular exercises helps to gain weight. Many people who have failed to regain their normal weight have experienced mood disorders on a daily, monthly, and even seasonal basis, the result of which was eating foods rich in hydrocarbons and resistance to doing physical activities and as a result obesity.

As the results show, the quality of life does not predict body mass index in adolescent girls. This finding is consistent with the findings of Qazvini and Kayani (2017), Nasiri Zarin-Qabaei et al. (2015), and Rabitz et al. (2020). In explaining the above finding, it can be said that obesity is a problem in all countries all around the world, especially in developing countries, and it is increasing rapidly. The reason is the reduction of physical activities due to the mechanization of lifestyle and the increase in the use of unhealthy and high-calorie foods and snacks. The quality of life of people in adolescence significantly leads to a decrease in obesity. Lifestyle modification is the most effective way to reduce obesity. Also, on the contrary, it can be said that obesity increases the risk of diabetes mellitus, high blood pressure, etc., and reduces the quality of life. Therefore, the effect of obesity is not only limited to increasing the risk of chronic diseases but obesity is related to many psychological aspects and quality of life, which may be more important for teenagers than increasing the risk of future diseases. In adolescents, there is a possibility that a lower level of quality of life will be observed in these people when they enter adulthood. On the other hand, the quality of life among adolescents who are

overweight is not suitable and worsens over time, and it shows itself in their behavioral habits.

Acknowledgment

References

Uraki, M.; Isazadeh, F. (2021). The effectiveness of mindfulness-based stress reduction on emotional regulation, perceived stress and adherence to treatment in patients with type 2 diabetes. Health Psychology Research Quarterly, 10(38)

Baskha, M., Aqeli-Kohneh Shahri, L. & Masaeli, A. (2010). Ranking of the quality of life index in the provinces of the country. *Journal of Social Welfare*, 10(37), 95-112.

Balath, K. (2020). Self-*Compassion: A Workbook for Adolescents*. Translated by Kazem Barzegar Befroui, Azadeh Abui & Arefeh Abui, Yazd, Yazd University Press.

Hakiminia, B., Pourafkari, N. & Ghaffari, D. (2017). Factors affecting the quality of life with an emphasis on social intelligence and social health (case study: Kermanshah city). *Applied Sociology*, 28(2), 163-178.

Ross, R. & Altmeier, E. (2017). *Job stress book*. Translated by Gholamreza Khajapour, Ch. 4, Tehran: Reklam Publishing.

Rezazadeh Sharma, M. (2021). Investigating the relationship between body mass index and mental image of the body with mental health in adolescent girls of the first secondary level of Mazandaran province. *Health Research Journal*, 6(2), 157-165.

Zare, M. Mahmoudi, M. & Samani, S. (2011). The relationship between family cohesion and quality of life with the happiness of elementary school teachers in Maroodasht city. The second national conference of psychology - family psychology.

Siri, S. & Siri, N. (2016). Investigating the effect of family cohesion on children's psychological factors. The third international conference on modern researches in management, economics and humanities.

Shahpanah, M.; Sirafi, M.R. (2022). Presenting a structural model for predicting health-related quality of life based on emotional regulation with the mediation of self-care in patients with coronary heart disease. Health Psychology Quarterly, 5(3),

Gholamian Eliato, M. (2020). *Factors affecting body mass index (BMI) of female school students*. Edition 1, Tehran: Azin Reza Pen Publishing.

FarsiJani, N. Ebrahim-Nejad Moghadam, S. & Melhi, E. (2021). An overview of self-criticism and self-compassionate in mental health. *Development of Psychology*, 10(11), 61-74.

Ghasadi Qazvini, Sh. & Kiani, Q. (2018). The relationship between body mass index and perceived stress and health-related quality of life and its comparison among male and female adolescents. *Nutritional Sciences and Food Industries of Iran*, 13(1), 31-39.

Kechoui, M., Hassani, J., Moradi, A. & Fathi Ashtiani, A. (2018). Comparison of mindfulness and self-compassion in women with high and normal body mass index. *Asil Social Health*, 5(2), 103-112.

Karimi, N., Bahadri, F., Khalkhali, H. & Rabieipour, S. (2017). *Journal of Urmia College of Nursing and Midwifery*, 15(4), 292-300.

Kline, R. B. (2005). Principles and practice of structural equation modeling, edition 2, Guilford press, New York & London

Mirhassani, S., Sharif-nia, H., Etebarian Khorasgani, A., & Ghanbari khanqah, A. (2020). Investigation of body mass index and its predictive factors in residents of Rasht city. *Paish Journal*, 19(5), 549-557.

Narimani, M., Samadifared, H., Sadeghi, G. & Sadeghi, N. (2017). Investigating the relationship between self-compassion and quality of life among spouses in Ardabil city. *Psychological Studies and Educational Sciences*, 20(3), 154-161.

Nasiri Zarin Qobaei, D., Talebpour Amiri, F., Hosseini Waleshkalii, S. M. & Rajabzadeh, R. (2016). Quality of life and its relationship with occupational stress in nurses working in Sari hospitals. *Journal of Nursing Education*, 5(2), 40-48.

Waziri, B. (2020). *Psychology of stress in students*. Tehran: Aftamat publishing.