

# Understanding the relationship between nutritional knowledge, self-efficacy, and self-concept of high-school students suffering from overweight

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## ABSTRACT

**Background and Aim:** Adolescents' overweight problems have been paid much attention due to their significant increase in recent decades in developed countries. Poor eating patterns subsequently affect their self-efficacy and self-concept. Therefore, paying attention to the nutritional knowledge of overweight students in this period is essential. This study examines the relationship between self-efficacy, self-concept, and nutritional knowledge of overweight students in the city of Isfahan. **Materials and Methods:** The 140 overweight students who participated in this descriptive, analytical study with were randomly selected from one of five areas of Isfahan city in the year 2011-2012. Questionnaires for data collection in this study included demographic form, nutrition knowledge, Cooper Smith self-esteem, and general self-efficacy questionnaire. Data were analyzed by ANOVA, regression, and Pearson's correlation coefficient with statistical package in social sciences version 18. **Results:** There was a significant correlation between whole nutritional knowledge and self-efficacy ( $r = 0.29$ ,  $P > 0.001$ ) and self-concept ( $r = 0.26$ ,  $P = 0.002$ ). There was a significant correlation between self-efficacy and self-concept ( $r = 0.3$ ,  $P = 0.001$ ). Furthermore, in the selection of food section there was no significant correlation with the self-concept ( $r = 0.147$ ,  $P = 0.083$ ). Regression analysis between self-concept, self-efficacy, family dimension, father's education, mother's education, father's occupation, mother's occupation and income with nutrition knowledge showed that these eight variables explain 17.7% of the variance in health behaviors totally. **Conclusion:** By conducting this study, and revealing the direct relationship between nutritional knowledge, self-concept, and self-efficacy, we could conclude that if nutritional knowledge of overweight students is promoted, this factor would lead to an increase their self-concept and self-efficacy in order to adopt healthy behaviors and have the expected healthy eating and healthy life-style.

**Key words:** Knowledge, nutrition, overweight, student, self-concept, self-efficacy

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## INTRODUCTION

The topic on adolescents' overweight is an issue that has attracted a lot of interest, due to a significant increase in recent

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decades in developed countries. Short- and long-term effects of overweight and obesity and its association with mortality is increasing, therefore, giving attention to the importance of this issue as one of the major health problems in children and adolescents is necessitated.<sup>[1]</sup> A recent report by the World Health Organization in 2002 suggests that obesity is one of the ten largest emerging health risks.<sup>[2]</sup> In the United States, the prevalence of overweight children and adolescents has tripled between 1980 and 2000 as about 80% of overweight adolescents will have this problem in adulthood. Adolescence is stressed as a critical period for the development of complications and disabilities due to overweight.<sup>[1,2]</sup>

Overweight in adolescence is associated with negative consequences on the physical and mental aspects. In the physical aspect, problems that can be mentioned are metabolic syndrome, type II diabetes, cardiac diseases - including cardiovascular diseases and cancer. Overweight is well above the range of other conditions, such as Cerebrovascular diseases (cerebra vascular accident), osteoarthritis, gallstones, dyslipidemia, sleep apnea, cataract, benign prostatic hyperplasia, dysmenorrhea, pregnancy complications, depression, and social discrimination. Furthermore, obesity will negatively affect physical function, vitality, and quality of life.<sup>[3-6]</sup>

Overweight and obese adolescents may experience discrimination, rejection, and low self-concept at the individual and social levels. The results of a study conducted at the University of California showed that obese adolescents have low self-concept, social isolation, depression, and rejection sense. Another study also showed that low self-concept led to feelings of sadness, loneliness, anxiety, and is more likely to result in the use tobacco and alcohol.<sup>[7]</sup>

Adolescence is an unique period in the life cycle.<sup>[8-10]</sup> Changes in adolescence in young people develop health-risk behaviors such as inactivity and poor eating habits.<sup>[11]</sup> Years of study in a school is where teenage life-style is shaped for adulthood. Dietary patterns are developed in this age may have a great impact in the future on the health and family of the individual; therefore, increasing the nutritional knowledge in this age is essential.<sup>[12]</sup> adolescence is hampering lifestyle. Studies show that unhealthy eating behavior is very common in Iran and it is often seen that the power consumption of a particular nutrient is limiting and there is no variation in the food pattern. The result of the studies shows that 50% of Iran's population are suffering from micronutrient deficiency such as iron, iodine, calcium, and vitamins and 18-20% of people suffer from disorders caused by an increase in excessive carbohydrate intake and the per-capita consumption of dairy products (170 g per day) is very low compared to that in the developed countries (450 g per day).<sup>[11]</sup>

Many of the children's favorite food products are abundant in the market, but the quality of those products is questionable with two aspects; the high quantity of sugar, fat, and salt and lack of valuable substances such as vitamins and minerals.<sup>[13]</sup>

Also, an improper method to reduce weight in the young is considered.<sup>[14]</sup> Modified dietary patterns during adolescence and early adulthood and having good eating behaviors are important for the prevention of the disease, which should be considered more than before.<sup>[15]</sup>

Consumption of fruits and vegetables having a high nutritional value is important, as much research has shown that consumption of fruits and vegetables reduces the risk of cancer, cardiovascular disease, and is an appropriate diet for weight management and protection of overweight children. A cross-sectional study in the United States showed inverse associations between childhood overweight and fruit consumption during this period (children 18-5 years). The results of the study showed an inverse relationship between vegetable consumption and overweight in males. Also, consuming foods that are rich in fiber such as whole grains and calcium have a protective role in the prevention of overweight and obesity.<sup>[16-18]</sup> The majority of risk factors of chronic diseases are related with behavioral and nutritional knowledge, so studies have shown that an increase in the awareness of adolescent health-related behaviors have a significant effect on the reduction of risky behaviors and promotion of healthy behaviors.<sup>[19]</sup>

Bandura believes that human success requires dedication, skill, and perseverance. These factors are achieved through self-efficacy. Self-efficacy is defined as "one's belief in his capabilities to organize and execute a course of action that requires managing prospective situations." According to Bandura's belief, this opinion is the determinant element for people as to how they think, behave, and feel and that is the way one can achieve desired results.<sup>[20]</sup> It is essential for an adolescent who is familiar with the concept of self-efficacy, to use it as an important concept to maintain healthy promotion behaviors and emphasizes on its role to impede the environmental factors that adhere to unhealthy habits and behaviors.<sup>[21]</sup>

Furthermore, having a sense of self-concept or self-worth as a vital asset and valuing those are major talents and creativity elements. In other words, cognitive processes, emotions, motivations, decisions, and choices are influenced by self-concept.<sup>[22]</sup> a way that the self-concept can affect health, is chosen healthy behavior, which is possible with increase of their knowledge.<sup>[23]</sup>

Due to the challenges associated with the nutritional knowledge of overweight children and their self-efficacy and self-concept that is emerging from this period and on the other hand due to inadequate research and critical issues affecting our country, the necessity of designing such studies are feeling consumedly. The purpose of this study was to determine the relationship between nutritional knowledge, self-concept, and self-efficacy of female high school students who are suffering overweight problem for presenting appropriate strategies to improve students' health, increase self-confidence, self-concept, and academic achievement among them.

## MATERIALS AND METHODS

This descriptive–analytical study was conducted with 140 participants. The participants were overweight girl students who were studying in the second grade in high school. They were randomly allocated from one district of five areas of the Isfahan city in year 2011-2012. The sample size was estimated at 140 with stratified random sampling method. The researcher randomly chose one of the five areas of education, then selected the second-grade overweight students from two schools of six schools of these districts based on stratified random sampling.

Criteria for inclusion were being overweight, according to body mass index above 85%, percentile charts based on the center of control and management of disease,<sup>[24]</sup> their willingness to participate in the study, and female sex. On the other hand, incomplete questionnaires that were referred by students were excluded. The researcher started sampling by receiving a letter of introduction from the Isfahan University of Medical Science and an informed consent was obtained from each subject in accordance with the guidelines of the committee on human research. During the initial session, the purpose of the study was explained and the consent form document was signed by student, parents of the student, and their school managers. Questionnaires for data collection in this study included demographic form, nutritional knowledge questionnaire, Cooper Smith self-esteem questionnaire, and general self-efficacy questionnaire.

The first section consisted of a nutritional knowledge questionnaire, which was a standard Latin questionnaire that researcher had translated into Persian and then back translated by researcher and also controlled by a nutritionist. To determine the reliability of the questionnaire, it was completed by 20 students, and the reliability was approved through Cronbach's alpha ( $\alpha = 0.75$ ). The scoring range was given the most appropriate grade of 1 and worst score of zero. Components of the questionnaire included four sections: (1) Student's relation to the food that is recommended by health experts; (2) divide the food into food groups; (3) select the desired type of food and (4) section for health problems or illnesses related to nutrition.

The second section of the Persian version on general self-efficacy was formed with 10 questions,<sup>[25]</sup> and evaluated the self-efficacy of students. Likert scoring of the fourth option (never, rarely, almost, and completely) was used for scoring and was between 0 and 3. Reliability of the questionnaire was approved from Cronbach's alpha coefficient ( $\alpha = 0.87$ ), respectively.

The third section of the questionnaire was about self-concept and applied the fourth option on the Likert scale, the minimum value being zero and the maximum value being three. standard tool that authentication has been confirmed by Raychr (1967), Campbell (1965), Smith (1967) and Karoon (1971) and has been confirmed in Iran by

Krvzhdh (1382), Sedaghat pishe (1384), Allameh (1384), Haghghi, *et al.* (1384) with ( $\alpha = 0.05$ ).<sup>[26]</sup>

The fourth section of the questionnaire included the demographic characteristics (household dimension, father's education, mother's education, income, father's occupation, and mother's occupation) respectively. After selecting the classes for data collection, questionnaires were distributed among the students after class time and supervised by a member of the research team for completing it. Once collected, the data were analyzed by ANOVA, regression, and Pearson correlation coefficient with Statistical Package in Social Sciences (SPSS) software version 18.

## RESULTS

In this study, 15% (21 students) of the households dimension had three members, 47.9% (67 students) had four members, 34.4% (48 students) had five members, and 2.9% (4 students) had six members. Furthermore, 17.9% (25 students) of their father's jobs were free, 35.7% (50) employees, 43.6% (61 students) of workers and 2.9% (4 students) unemployed. Also, 75.7% of the students' (106 students) mothers were housewives, 13.6% (19 students) employees, and 107% (15 students) were free. The education level of the students' fathers were – 1.4% (2 students) illiterate, 2.9% (4 students) primary, 16.4% (23 students) 49.3% (69 students) intermediate, and 30% (42 students) were educated in a university. The education level of the students' mothers was – 4.3% of the students' mothers (6 students) were illiterate, 5.7% (8 students) were educated till the primary level, 32.9% (46 students) guidance, 40% (56 students) were educated till the secondary level, and 17.1% (24 students) had obtained university education. In terms of income, 18.9% (12 students) had income below 3500 thousand Rials and 81.1% (52 students) had income above 3500 thousand Rials.

Mean, standard deviation, and range of scores on acquisition of self-efficacy, self-concept, and knowledge of nutrition (Includes a section on the students in relation to the foods that are proposed by health professionals, the division of food in to the foods groups, the section related to the choice of students on food variety, and health-related problems or nutrition-related diseases) was shown in Table 1.

In this study, a significant difference existed in the mean score of students' nutritional knowledge and the father's education ( $P = 0.036$ ) and maternal education ( $P = 0.006$ ). But no statistically significant relationship existed in the nutritional knowledge scores of students with fathers ( $P = 0.13$ ) and mother's occupation ( $P = 0.48$ ). Students whose parents were highly educated, the average score of nutritional knowledge was higher than that the other groups [Table 2].

According the results of this study, there was a significant correlation between whole nutritional knowledge, self-efficacy ( $r = 0.29$ ,  $P > 0.001$ ), and self-concept ( $r = 0.26$ ,

**Table 1: Mean, standard deviation and score range acquisition efficacy, self-esteem and students nutrition knowledge**

Variables	Mean (standard deviation)	Score range acquisition
Efficacy	54.05 (12.01)	0-30
Self-esteem	52.70 (7.54)	0-105
Nutrition knowledge		
Section is about what advice you think experts are giving us	46.88 (11.51)	0-33
Section is about people classify foods into groups	49.35 (15.19)	0-195
Section is next few items are about choosing foods	48.39 (16.85)	0-12
Section is about health problems or diseases	50.09 (15.26)	0-93

**Table 2: Comparison of students nutritional knowledge score in terms of education and occupation of parents**

Variables	Number	Mean (standard deviation)	P value
Father education			<i>P</i> = 0.036
Illiterate	2	44.59 (15.26)	
Primary	4	35.13 (14.30)	
Guidance	23	47.82 (11.41)	
Diploma	69	52.48 (15.05)	
Collegiate	42	46.33 (12.05)	
Mother education			<i>P</i> = 0.006
Illiterate	6	41.16 (9.08)	
Primary	8	42.61 (12.01)	
Guidance	46	49.56 (14.74)	
Diploma	56	45.68 (12.56)	
Collegiate	24	53.11 (13.94)	
Father occupation	6	46.44 (13.59)	<i>P</i> = 0.131
Unemployed			
Worker	63	49.52 (13.46)	
Employee	50	47.94 (17.84)	
Self-employment	21	47.46 (14.60)	
Mother occupation			<i>P</i> = 0.483
Housekeeper	106	48.52 (14.15)	
Employee	19	50.49 (12.77)	
Self-employment	15	52.91 (14.17)	

*P* = 0.002). This result indicates that with increase in the nutritional knowledge of students, their self-efficacy scores and self-concept scores increase. In particular, self-efficacy and self-concept were significantly correlated (*r* = 0.3, *P* > 0.001). Part of the student's opinion regarding foods that are recommended by health professionals were not significantly correlated with self-efficacy (*r* = 0.07, *P* = 0.38) and self-esteem (*r* = 0.08, *P* = 0.149). Also, the individuals' selection of food choice was not significantly correlated with their self-concept (*r* = 0.147, *P* = 0.083) [Table 3].

Regression analysis between self-concept, self-efficacy, family dimension, father's education, mother's education,

**Table 3: Relationship between nutrition knowledge items, total nutrition knowledge, self-efficacy and self-concept**

Variables	1	2	3	4	5	6	7
Score about section is what advice you think experts are giving us	1						
Score about section is people classify foods into groups	0.229	1					
Score about section is next few items are about choosing foods	0.198	0.615	1				
Score about section is health problems or diseases	0.019	<0.001		1			
Nutrition knowledge scale score	0.313	0.993	0.628	0.975	1		
Self-efficacy scale score	0.075	0.294	0.260	0.288	0.299	1	
Self-concept scale score	0.381	<0.001	0.002	<0.001	<0.001		1
	0.079	0.002	0.083	0.006	0.002	<0.001	

father's occupation, mother's occupation, and income with nutritional knowledge showed that these eight variables explain 17.7% of the variance in health behaviors totally. In these variables, for predicting of self-concept, self-efficacy, and efficacy, maternal education was significant, so increase in the mother's level of education, led to promote levels of self-efficacy, self-concept, and nutritional knowledge. Meanwhile, prediction of self-efficacy ( $\beta = 0.24$ ) is more than other variables [Table 4].

## DISCUSSION

In this study, students' nutritional knowledge score were 49.73% which was approximately moderate to low. In a study that was conducted by Obrein in 2006 showed that nutritional knowledge of students in the majority of the cases was low.<sup>[27]</sup> Given that this period is one of the most critical periods for the formation of healthy feeding habits and behaviors, programs and counseling to improve their provision of nutritional knowledge should be supported and the students' participation should be implemented in the school environment. The dire consequences of overweight in adulthood can be controlled and prevented to a certain extent.

**Table 4: Regression analysis of variables related to nutrition knowledge**

Independent variables	Standardized $\beta$	P value	R <sup>2</sup>
Self-efficacy	0.237	0.005	0.177
Self-concept	0.176	0.038	
Family	0.053	0.52	
Father education	0.005	0.952	
Mother education	0.173	0.026	
Income	0.017	0.835	
Father occupation	0.112	0.165	
Mother occupation	0.096	0.244	

Obrein study also showed that there are no significant differences between parent education and nutritional knowledge of students. On the other hand, Rojas *et al.*, reported that parents' education level, affects the consumption of fruits and vegetables and calcium-rich foods of adolescents. So that students whose parents had more education, consumed more fruits and vegetables.<sup>[28]</sup> Obrein and Rojas' findings confirmed the results of this study and emphasis is on this fact that if the parents were well-educated, the natural remedies for optimal utilization of healthy eating habits are used more by kids and their risk of obesity-related diseases is decreased.

Korwanic study that was conducted in 2007 with entitled "The opinions of parents, teachers, and school coaches in conjunction with a healthy diet" has reported that the one factor that was affecting food choice in children was socio-economic status.<sup>[29]</sup> Perry and Potter write that income and nutritional knowledge affected the food choices.<sup>[30]</sup> This finding does not align with this study that showed no significant relationship between nutritional knowledge and food choices with income. Considering the results, it can be acknowledged that perhaps one of the issues on selecting and preparing healthy meals that is effective in adolescences was economy and income levels, but it should not be forgotten that poor diet and lack of availability of food in the school environment, inadequate use of fruits, and turning of students to fast foods and prepared-in foods during recess could be a concern that puts adolescents at risk for overweight. Health planners and their interaction with the department of education should focus more on these issues for the codification of guidelines for use in food and food habits and emphasized for education in the school and even at home with the adolescent's family.

In this study, positive correlations existed between nutritional knowledge, self-efficacy, and self-concept of students with overweight. Buttris' results also show that a significant correlation exists between self-concept and nutritional knowledge.<sup>[31]</sup> Our findings showed positive significant relationship between nutritional knowledge and self-efficacy scores under bivariate regression. Landis

and colleagues in 2003, in a study entitled, Social support, knowledge, and self-efficacy as factors associated with osteoporosis-prevention behaviors in girls reported positive Pearson correlation coefficient between consumption of foods containing calcium and self-efficacy.<sup>[32]</sup> Berman (2006) also believes that the efficacy of nutrition-related behaviors is visible in several positions, one of these conditions, is when food is available for them.<sup>[33]</sup> In the present study, the predictive power of the self-efficacy in student's nutritional knowledge criterion according to the regression analysis confirmed that this study is consistent with Walker and colleagues<sup>[34]</sup> and Von and colleagues studies.<sup>[35]</sup> In this study, that examined the relationship between self-concept, self-efficacy, and knowledge of nutrition and health behavior, it has been shown that self-efficacy has an even more powerful effect than self-concept. This finding is convergent with Yarcheski study.<sup>[36]</sup> Perhaps it is acknowledged that the concept of self-efficacy is important and it has priority than self-concept because of the specific age requirements for youth and self-concept may be more highlighted in older, therefore self-efficacy topic and its association with nutritional knowledge is highlighted in this age.

According to this research, the findings that indicate the predictive role of self-efficacy and self-concept in nutritional knowledge and health-promoting behaviors such as healthy eating of participants, authorities, and health-care providers can plan and design health promotion programs for improving health and behaviors. This activity can increase self-efficacy of adolescents and subsequently increase the nutritional knowledge and change behavior, not only in the students' knowledge, but can also provide for their families. Also responsible for mass communication like radio-television and education authority's adolescences' girls and models presented through the support of appropriate and arrange sense of confidence in their knowledge of pupils achieving health boost. These programs can be used to enhance the nutritional knowledge of adolescents with regular meetings of parents, teachers, advisors, nutrition consultants, and behavioral health providers this meeting, diet and nutrition and basic health education of adolescents, especially girls, should be discussed with the teachers and parents to raise their awareness. Given the critical role of the school and the family foundation, these programs emphasize the centrality of the family and the schools and are conducted in partnership with parents and teachers. The effectiveness of these programs is crucial to control the risk of future overweight adolescents. It is hereby recommended that further research be conducted in this area and the relationship between self-efficacy and self-concept on physical activity and other behavioral health issues in other age groups and male students also be evaluated.

Despite the results, this study also had some limitations that can be pointed to the participation of the overweight women, so it is recommended that this study also be conducted in male groups and the results compared. As this study only focused on the city of Isfahan, it is recommended that such research be carried out all over the country for health planners to

think more carefully about the issue of childhood overweight and apply appropriate strategies to improve health in this age group.

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