Original article

The Level of Readiness to Make Changes Towards Reaching and/or Sustaining a Healthy Weight Among Male Students of Qassim University

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Abstract:

Objectives: To estimate the distribution of the stages of change, which categorize the progression towards reaching and/or sustaining a healthy weight among male students of Qassim University.

Methods: A cross-sectional study was performed among male students of Qassim University during the 2016-2017 academic year**.** A random sample was carried out with an estimated sample size of 297. The data were obtained from a self-administered questionnaire. The weight and height of each study participant were measured by the researchers.

Results: Among the 264 male students who agreed to participate, 46% were within a healthy weight range while 6.9%, 21.4%, 21.8% and 4.8% were underweight, overweight, obese and morbidly obese, respectively. About 72.3% of the students were in the preparation, action, or maintenance stages (i.e. advanced stage) of reaching or maintaining an ideal weight, especially those who were of healthy weights, overweight or obese. Logistic regression was performed to ascertain the effects of the study variables on the likelihood that participants were in the advanced stage and revealed statistically significant association only for the importance level of reaching and/or sustaining the healthy weight and the adherence to regular exercise.

Conclusion: A large proportion of the students were in the advanced stage of reaching or maintaining an ideal weight. Only about half of the participants had a healthy body weight. Educational programs should be designed and implemented at all educational levels and in the community for raising the level of readiness for lifestyle changes aimed at reaching and sustaining a healthy weight.

Key words: Obesity, overweight, healthy weight, stage of change, Qassim University

الملخص

الأهداف: تقدير مستوى الاستعداد لإجراء تغييرات في نمط الحياة للوصول و / أو الحفاظ على وزن صحي بين الطلاب في جامعة القصيم.

الطريقة: تم إجراء دراسة مقطعية بين الطلاب في جامعة القصيم خلال العام الدراسي 2016-2017. حيث تم أخذ عينة عشوائية بحجم تقديري 297. و تم الحصول على البيانات من خلال استبيان يجيب عليه الطالب. وتم قياس الوزن والطول لكل مشارك في الدراسة من قبل الباحثين.

النتائج: 264 طالباً وافقوا على المشاركة في البحث ، كان 46٪ من الطلاب في نطاق الوزن المثالي بينما كان 6.9٪ و 21.4٪ و 21.8٪ و 4.8٪ يعانون من نقص الوزن وزيادة الوزن والسمنة والسمنة المفرطة على التوالي. حوالي 72.3٪ من الطلاب كانوا في مراحل الإعداد أو العمل أو المحافظة (أي المرحلة المتقدمة) للوصول إلى أو للحفاظ على الوزن المثالي، خاصة أولئك الذين كانوا ذوي أوزان صحية أو يعانون من زيادة الوزن أو السمنة. تم إجراء الانحدار اللوجستي للتأكد من آثار متغيرات الدراسة على احتمال أن المشاركين كانوا في المرحلة المتقدمة من تغيير نمط الحياة وتم اكتشاف الارتباط إحصائيا فقط للمتغيرات التالية: مستوى أهمية الوصول إلى و / أو الحفاظ على الوزن الصحي و ايضا الالتزام بممارسة التمارين الرياضية بانتظام.

الخلاصة: كانت نسبة كبيرة من الطلاب في مرحلة متقدمة من الوصول إلى أو الحفاظ على الوزن المثالي. فقط حوالي نصف المشاركين كان لديهم وزن صحي. ينصح بالعمل على تنفيذ البرامج التعليمية والتوعية في جميع المراحل التعليمية وكذلك في المجتمع لرفع مستوى الاستعداد لتغيير نمط الحياة بهدف الوصول إلى وزن صحي والحفاظ عليه.

الكلمات المفتاحية: السمنة، الوزن الزائد، الوزن الصحي، مرحلة التغيير، جامعة القصيم

Introduction:

Obesity is defined by the World Health Organization (WHO) as the abnormal or excessive fat accumulation in the body, as measured by body mass index (BMI), and represents a major risk to human health. Obesity is a problem not only in high-income countries, but is now significantly on the rise in low- and middle-income countries [1]. Elevated BMI is a risk factor for many diseases including cardiovascular diseases (mainly heart disease and stroke), type 2 diabetes mellitus, hypertension and osteoarthritis. Obesity has also been shown to play a role in some cancers (e.g. endometrial, breast, ovarian, gallbladder, kidney and colon) [2].

Worldwide, the percentage of adults with BMIs of 25 kilogram (kg)/meters^2 (m) or more increased between 1980 and 2013 from approximately 28.8% to 36.9% in males, and from 29.8% to 38.0% in females [3]. The Kingdom of Saudi Arabia (KSA), Kuwait, Qatar, and the United Arab Emirates recently joined the list of top ten countries worldwide for obesity [4]. In the KSA, recent surveys have estimated that 28% of men and 44% of women are obese. Around 38% of men and 27% of Saudi women are overweight [5]. Younger populations are not immune to this epidemic; college students are frequently exposed to unhealthy behaviors that lead to weight gain [6]. In a study conducted in the KSA, 21.8% and 15.7% of male University students were found to be overweight and obese, respectively [7].

Helping patients change their behavior is a very important role for every physician. Behavioral changes and lifestyle modifications are useful for disease prevention and long-term disease management. Transtheoretical Model of Change, also known as the Stages of Change model should be well understood [8]. Five stages of change have been developed for a variety of behaviors. The five stages of change are pre-contemplation (stage at which there is no intention to change behavior in the foreseeable future), contemplation (the stage at which people are thinking about the change in the next six months), preparation (the people are intending to take action in the next month), action (individuals are currently modifying their behavior) and maintenance (actively work to prevent relapse) [9, 10]. In one study, a large proportion of primary care patients were at preparation, action and maintenance stages of change to lose weight, improve diet, and increase participation in regular exercise [11].

The purpose of the current study was to estimate the distribution of the stages of change (SOC), which categorize the progression towards reaching and/or sustaining a healthy weight among male students of Qassim University (QU) in Qassim Region of the KSA.

Methods:

A cross-sectional study was used to analyze male students of QU during the 2016-2017 academic year. Inclusion criteria included male students registered in the academic year 2016-2017. Excluded from this study were students with any disability, students

who underwent surgery that limits their current activity, and students of the College of Physical Education because exercise is mandatory in their curriculum.

A random sample was used in which five colleges from QU were randomly selected: College of Islamic Studies, College of Engineering, College of Business and Economics, College of Pharmacy and College of Medicine. The researchers were distributed among these five colleges to collect the data from February through March 2017. The estimated sample size was around 270, assuming that the lowest prevalence of pre-contemplation stage among QU students was 25% with a confidence interval 95% and desired precision of 0.05. After factoring in a non-response rate of 10%, a total number of 297 participants was estimated to be required for this study.

Data were collected using a questionnaire developed based on the study variables with the help of experts from Family and Community Medicine Department of QU. The distributed questionnaires were self-administered by the participants. The participant's weight and height were measured with light clothes without shoes. Weight was recorded to the nearest 0.5 kg and height was taken to the nearest centimeter. BMI was calculated as the ratio of the weight in kg to the square of height in meter [1]. BMI was considered underweight if < 18.5 kg/m^2, healthy if < 25 kg/m^2, overweight if 25 – 29.9 kg/m^2, obese if 30 - 39.9 kg/m^2 and morbidly obese if ≥ 40 kg/m^2 [1].

The study variables included age, nationality, marital status, college, smoking status, co-morbidities, thinking about his current weight, awareness of the complications and the readiness to make changes to reach or sustain a healthy weight. Advanced SOC were defined as being in the preparation, action, or maintenance stages to reach and/or maintain a healthy weight. The participants were asked to rate the importance of reaching and sustaining a healthy weight from one (not important at all) to ten (most important thing), the same method was also applied to the confidence level. The importance and confidence level were classified as follows: scale from 1-3 was classified as low, 4-7 as medium and 8-10 as high importance/confidence. Adherence to physical exercise was defined as walking for at least 30 minutes for five days or more per week. The students were also asked to report other types of exercise. Following a healthy diet as advised by a dietitian or physician required adherence to five days per week or more. A pilot study was carried out with 30 subjects to allow for modification of the questionnaire before the collection of data.

Important information about the study was explained to the participants by the researchers. The participants were then asked to carefully read the consent form, before agreeing to participate in this study. The confidentiality of the participants was ensured. This research was approved by the regional research ethics committee of the Qassim region.

The Statistical Package for Social Sciences (SPSS, version 21) was used for data analysis. Results were described using means

with standard deviations for continuous variables and proportions for categorical variables. Chi-square test was used to assess the statistical significance of the difference in the percentage of the SOC to categorical variables. A logistic regression was performed to ascertain the effects of the study variables on the likelihood that participants were in the advanced SOC. A P value < 0.05 was considered to be statistically significant.

Results:

A total of 264 of male students participated in the study and 33 declined to participate (non-response rate of 11.1%). Table 1 shows the frequency of the study variables. More than half of the participants were 21-25 year-old and most were non-smokers (92.7%). Based on BMI, less than half of the students (45.2%) had a healthy weight. Nearly 48% of the participants had elevated BMI (≥25 kg/m^2): 21.4% were overweight, 21.8% were obese and 4.8 % were morbidly obese.

Only 8% of the students reported health problems (asthma, joints pain, irritable bowel syndrome and hypersensitivity to penicillin). In regards to the students' perspectives on their body weight status, only 46.1% answered correctly. It was found that most of the study sample (84.6%) was aware of the complications and the consequences of obesity, which they reported to include: diabetes, hypertension, increased chance of blood clots, joint problems, cirrhosis, cancer, high cholesterol, irritable bowel syndrome, anemia and difficulty walking. 72.3% of the students were in the advanced stages towards reaching or sustaining an ideal weight. Only 22.5 % of the students were engaging in regular exercise, whereas 34% of the students reported doing other types of exercise such as: core workouts, swimming, football, volleyball and bodybuilding.

Table 1: Study variables:

Study variables		Frequency	Percent
Age (years):	15- 20	109	41.9
	21-25	148	56.9
	26- 30	3	1.2
Nationality:	Saudi	246	94.3
	Non-Saudi	15	5.7
Marital status:	Married	8	3.1
	Single	254	96.9
Colleges:	Islamic studies	49	18.6
	Engineering	49	18.6
	Business and Economics	42	15.9
Pharmacy		55	20.8
	Medicine	69	26.1
Smoking status:	Smoker	16	6.1
	Non-smoker	242	92.7
	Ex-smoker	3	1.1
BMI:	under 18.5	17	6.9
	18.5-24.9	112	45.2
	25-29.9	53	21.4
	30-39.9	54	21.8
	Over 40	12	4.8
Co-morbidity:	Yes	21	8
	No	241	92
Weight status (self-reported):			
	Underweight	56	21.2
	Healthy weight	92	34.8
	Overweight	76	28.8
	Obese	30	11.4
	Morbidly obese	9	3.4
Awareness of the complications:	Yes	219	84.6
	No	40	15.4
Level of readiness to reach or maintain a healthy weight:			
	Maintenance	76	29.2
	Action	74	28.5
	Preparation	38	14.6
	Contemplation	36	13.8
	Pre-contemplation	36	13.8
Importance level of reaching or sustaining a healthy weight*:			
	Less importance	33	13.1
	Medium importance	83	32.9
	High importance	136	54
Confidence level in ability to reach/sustain a healthy weight*:			
	Low confidence	32	12.7
	Medium confidence	95	37.8
	High confidence	124	49.4
Adherence to regular exercise:	Not	200	77.5
	Yes	58	22.5
Other types of exercise:	Yes	87	34.0
	No	169	66.0
Adherence to Diet:	Not	212	80.3
	Yes	52	19.7

Table 2: The stages of change for weight loss and/or maintenance by variables*:

Study variables		Advance SOC		P Value †
		Yes	No	
Age (years):	15- 20	73 (67.6%)	35 (32.4%)	
	21-25	111(76%)	35 (24%)	0.186
	26- 30	3 (100%)	0	
Nationality:	Saudi	176 (72.1%)	68 (27.9%)	
	Non-Saudi	11 (78.6%)	3 (21.4%)	0.431
Marital status:	Married	6 (75%)	2 (25%)	
	Single	181 (72.1%)	70 (27.9%)	0.608
The college:	Islamic studies	34 (70.8%)	14 (29.2%)	
	Engineering	34 (70.8%)	14 (29.2%)	
	Business and Economics	32 (76.2%)	10 (23.8%)	0.689
	Pharmacy	43 (78.2%)	12 (21.8%)	
	Medicine	45 (67.2%)	22 (32.8%)	
Smoking status:	Smoker	11 (68.8%)	5 (31.1%)	
	Non-smoker	172 (72%)	67 (28%)	0.535
	Ex-smoker	3 (100%)	0	
BMI:	Under 18.5	6 (40%)	9 (60%)	
	18.5-24.9	88 (78.6%)	24 (21.4%)	
	25-29.9	39 (75%)	13 (25%)	0.001
	30-39.9	26 (72.7%)	10 (27.8%)	
	Over 40	14 (48.3%)	15 (51.7%)	
Co-morbidity:	Yes	15 (75%)	5 (25%)	0.501
	No	172 (72%)	67 (28%)	
Thinking about their current weight:				
	Underweight	8 (47.1%)	9 (52.9%)	
	Healthy weight	78 (78.4%)	24 (21.6%)	0.003
	Overweight	38 (74.5%)	13 (25.5%)	
	Obese	37 (68.5%)	17 (31.5%)	
	Morbidly obese	4 (33.3%)	8 (66.7%)	
Aware of the complications:	Yes	166 (76.1%)	52 (23.9%)	
	No	21 (52.5%)	19 (47.5%)	0.003
Importance level of reaching/sustaining a healthy weight‡:				
	Less importance	11 (34.4%)	21 (65.5%)	0.000
	Medium importance	52 (62.7%)	31 (37.7%)	
	High importance	117 (86%)	19 (14%)	
Confidence level in ability to reach/sustain a healthy weight‡:				
	Low confidence	14 (43.8%)	18 (56.3%)	0.000
	Medium confidence	65 (69.1%)	29 (30.9%)	
	High confidence	100 (80.6%)	24 (19.4%)	
Adherence to regular exercise:	Yes	56 (96.6%)	2 (3.4%)	0.000
	No	129 (65.2%)	69 (34.8%)	
Adherence to regular exercise other than walking:				
	Yes	70 (81.4%)	16 (18.6%)	0.012
	No	113 (67.3%)	55 (32.7%)	
Adherence to a healthy diet:	Yes	47 (90.4%)	5 (9.6%)	
	No	140 (67.3%)	68 (32.7%)	0.000

* Chi-square test was used to assess statistical significance of the differences between the percentages of SOC according to the categorical variables

† *P* value < 0.05 was considered to be statistically significant.

‡ Scale from 1-3 was classified as low, 4–7 as medium and 8-10 as high.

More than 70% of students who had a healthy weight, overweight or obesity but less than half of underweight or with morbid obesity were in the advance SOC (Table 2). No significant associations were found between SOC and the age, nationality, marital status, smoking status, presence of co-morbidities or the colleges. Most students who reported high importance to or high confidence to reach or sustain a healthy weight were in the advance SOC and less for those who reported low importance or low confidence. Most student who were adherent to a healthy diet or regular exercise were in the advanced SOC. Most of the participants who were aware of the consequences of obesity had advanced SOC.

Table 3: Logistic regression analysis of variables associated with advanced stage of change:

Variable	Odd ratio (95% confidence interval)	P value*
Importance level of reaching or sustaining a healthy weight†:		
Less importance	1	.021
Medium importance	4.39 (1.25-15.36)	<.0005
High importance	14.21 (4-50.43)	
Adherence to regular exercise:		
No	1	.001
Yes	12.87 (2.74-60.51)	

* *P* value < 0.05 was considered to be statistically significant.

†Scale from 1-3 was classified as low, 4 - 7 as medium and 8 -10 as high.

As shown in Table 3, the logistic regression model was statistically significant only for the importance level of reaching and/or sustaining a healthy weight and the adherence to regular exercise. The students who reported medium or high importance were 4.39 and 14 times more likely to be in advanced SOC, respectively.

Discussion:

The Trans theoretical Stages of Behavior Change Model describes the readiness to change unhealthy behavior as in smoking cessation [12-14] and, to a lesser degree, estimates the intention to lose weight [15, 16]. The current study found that nearly 72% of all students and 72.7-75 % of students whose BMI ranged from 25 to 39.9 were in the preparation, action, or maintenance stages for weight modification. These findings are slightly higher than what has been reported by the study on primary care patients [11]. Similar to the results reported here, 67.2% of overweight and obese adolescents in Malaysia were in the preparation, action, or maintenance stages of reaching their ideal weight [17].

A study on black women under the age of 40 with BMI over 25 reported that about 55% were in the preparation and action stages of losing weight, which was lower than this study [18]. In another study, obese workers were found in the following stages of weight change: pre-contemplation (4%), contemplation (45%), preparation (13%), action (21%), and (17%) maintenance; in total, 50% were

in the advanced SOC for weight management [19], which is also lower than this report. In one research study done on patients with either diabetes or hypertension, 70.8% reported being in the action or preparation stage for weight control [20]. Preparation was the most frequently reported stage for weight-related behavior among obese patients in primary care centers [21]. Because patients at the precontemplation and contemplation stages are mostly unmotivated to change their behavior [22], they are less likely to benefit from counseling on specific behavioral interventions.

The rate of obesity among male students at QU was found to be 26.6%. This is similar to the rate reported by one study that revealed that the prevalence of obesity among Saudi males was 28% [5]. In another study was published in International Journal of Health Science of QU, 81% of adults in the Riyadh region don't engage in any regular physical activity [5], , which is line with what has been seen in the current study. The exercise results from this study are similar to one from United States of America that showed that high proportion of college students maintained low levels of physical activity [6].

The study presented here shows that about half of the students were within a healthy weight range while 21.4% were overweight, 21.8% were obese and 6.4% of students were underweight. The results were similar to other studies performed in the KSA: in QU (Rass Branch) most of the students maintained a healthy weight and the prevalence of being overweight and obese was 21% and 15.7%, respectively, and 5% were underweight [7]. Most of the participants (77%) who were aware of the negative consequences of obesity were in the advance SOC, which is consistent with the results of previous report [11].

Strengths and limitations:

To our best knowledge, this is the first study carried out in QU which discussed the level of readiness to change to or maintain an ideal weight. Nevertheless, this study has some limitations. The study was conducted at one university and results may not be broadly applicable. All data were self-reported and results related to diet, exercise, weight, and SOC may be overly optimistic. We were also not able to use validated, objective instruments to assess these behaviors.

Conclusions:

It can be concluded that a large proportion of the students (72%) were in the advanced stage of reaching or maintaining an ideal weight. Only about half of the participants had a healthy body weight. Students should act to reach their ideal weight rather than only understanding the consequences of obesity (82.6%). Educational programs should be designed and implemented at all educational levels and in the community for raising the level of readiness for lifestyle changes aimed at reaching and sustaining a healthy weight.

Conflict of interest: none

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