

# Application of Health Belief Model among Youth at High Risk for Obesity in West Bank (Palestine)

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**Abstract:** Overweight and obesity are the fifth leading risk for global deaths. At least 2.8 million adults die each year as a result of being overweight or obese. The study aim to evaluate the effect of application of health belief model (HBM) among youth at high risk for obesity in Palestine (West Bank). Research design: A quasi- experimental design was used. Settings: The study was conducted at Faculty of Nursing /A-Najah National University which located in Nablus and IBN Sina College for Health Sciences, West Bank- Palestine. Subjects: A purposive sample of 117 students, from both previous setting at high risk for obesity was included. Tools, three tools were used to collect data. A self-administered questionnaire, it was composed of 4 parts; the health belief model (HBM) sub- constructs which used in this study and anthropometric measurement to detect body mass index & levels of risk for obesity. Results: Revealed that according to BMI and levels of risk for obesity shows, less than half of youth were obesity class I (low risk) while more than one third was obesity class II (moderate risk). There was a highly significant difference between student's knowledge and their practices regarding obesity, healthy food, and exercises pre & post application of HBM. Conclusion: Application of health belief model was effective in improved knowledge and practices of the student at high risk for obesity and changing health behavior. Recommendations: Conducting routine screening for obesity, dieting, and other weight reduction practices as an integral part of the ongoing health care provided by all health services. HBM also suggests that the benefits and barriers of changing health behavior must be taken into consideration, as those who perceive more benefits than barriers are more likely to take action.

**Keywords:** High Risk for Obesity, Youth, Health Belief Model

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## 1. Introduction

The adult who are obese have a higher risk of low back pain and knee osteoarthritis. Also, obese women are at higher risk for multiple cancers, including endometrial cancer, cervical cancer, breast cancer, and perhaps ovarian cancer [1]. Physically It is likely to suppose that the increase of musculoskeletal and joint problems and the association with other chronic diseases might explain mobility limitations e.g., bathing, dressing, getting in or out of bed, walking, climbing stairs, rising from a chair), early fatigue, dyspnea and a reduction in different kinds of job tasks [2]. Weight change and nutrition behaviors among college students have become major health concerns for universities around the

nation. According to the National Collegiate Health Risk Survey in the [3], one in five college students was overweight and there was a reported threefold increase in young adults ages 18-29 classified in the obesity class III – BMI  $\geq 40$  [4]. This increase in weight during the college years, especially freshman year, has been related to the dramatic changes a college student goes through during the transition from high school to college. This transition includes a change in environment, restrictions or lack thereof, social norms and exposures (alcohol, tobacco, drugs, sexual activity, etc.), and behaviors [5].

World Health Organization estimates that 30% of the population in the Arab world is overweight or obese, including adolescents. Overweight and obesity are now on the rise in low- and middle-income countries, particularly in

urban settings [6]. Adolescence is often referred to as the period of development that begins at puberty, around 12-18 years of age, and ends with physiological maturity, around 19 years of age. Adolescent obesity is one of the major global health challenges of the 21st century. The prevalence of obesity among adolescent quadrupled from 2009 to 2015 from 4.6% to 17.6%. Over weight causes adverse health, social, and emotional outcomes and increases adolescents risk of disability and premature death as adults [1, 7].

The Behavioral Risk Factor Surveillance System [8] reported that the greatest increase in obesity rates was among individuals ages 18-29 with at least some college education [9]. This increase in weight change is a result of multiple contributors which include food composition and eating behaviors, increases in eating at restaurants, increases in portion sizes, increases in unhealthy snacking, increases in consumption of saturated fat, increases in television viewing, decreases in physical activity, and a lack of appropriate duration and quality of sleep [10, 11].

Physical inactivity contributes to weight change among college students. Adults need at least 150 minutes of moderate-intensity aerobic activity a week for at least 30 minutes a day, at least four days a week and two or more days a week of muscle-strengthening activities. Moderate-intensity aerobic activity is categorized as brisk walking, water aerobics, riding a bike on level ground, pushing a lawn mower, etc. Muscle-strengthening activities should include the work of all major muscle groups (legs, hips, back, abdomen, chest, shoulders, and arms) to include lifting weights, using resistance bands, the use of body weight for resistance (push-ups and sit-ups), heavy gardening, or yoga [12].

The health belief model (HBM) has been used to examine predictors of health behaviors in college students. The HBM has been widely used to explain change and maintenance of health - related behaviors for individuals and it has been used as a framework for health interventions [13].

Nursing program may provide the best impact if implemented at the college- age level based upon the impressionability and potential for positive adherence of college students [14]. Class-based interventions have shown to be an effective approach in changing health behaviors of college students. It is also recommended that these interventions target the mediators of weight gain through the inclusion of goal setting, planning, and self-monitoring nutrition and physical activity behaviors. The Health Belief Model (HBM), have been applied to understand or change dietary behavior and/or weight. Research incorporating theory to better understand weight change and nutrition behaviors among college students were reviewed [15].

### **1.1. Significance of the Study**

The increased prevalence of obesity is a rising public health concern in Palestine because of the detrimental health effects associated with adult overweight and obesity. Excess body fat associated with being overweight or obese has serious health consequences on the body's metabolism. Other health concerns of overweight and obesity include: increased

rates of diabetes, heart disease, hypertension, stroke, and certain cancers, in addition to the associated burden on the national health care system [16].

The rank order for obesity in Arabic-speaking countries according to [17]. estimates in Kuwait (55.2%), Egypt (48%), and the United Arab Emirates (42%), which is higher than all the European countries and about the same as the United States of America (48.3%) and Mexico (41%). Countries such as Palestine (44%), Bahrain (37.9%), Jordan (37.9%), Saudi Arabia (36.4%), and Lebanon (27.4%) have higher obesity rates than UK (26.3%), and Greece (26.4%) [18]. Nurses must be address obesity both as a preventable disease through health promotion across the lifespan and as a chronic disease that negatively affects physical and psychological well-being [19]. The CHN must provide counseling to those persons who are in particular risk of overweight /obesity [20]. Dietary advice particularly on the importance of daily intake is of high priority and smoking prevention. The nurse must encourage proper dieting, regular exercise and waking, how to do it without effect on their health [21].

### **1.2. Aim of the Study**

Evaluate the effect of the application of health belief model among youth at high risk for obesity in Palestine (West Bank) through:

1. Assessing their knowledge and practices regarding of obesity, BMI and levels of risk for obesity and nutritional status according to their belief.
2. Developing and implementing the program for obese youth, according to their needs.
3. Evaluating the effectiveness of the health belief model on their improvement of knowledge and practice of youth.

### **1.3. Research Hypothesis**

The researchers hypothesized that the youth students who received health belief model would expect to improve knowledge and practices about obesity as indicated by pre and post application of HBM.

## **2. Methodology**

### **2.1. Research Design: A Quasi-Experimental (Pre-post) Study Design Was Used**

### **2.2. Setting**

The study was conducted at Faculty of Nursing /A-Najah National University which located in Nablus-West Bank-Palestine with a total capacity of around 23000 university students and IBN SINA College for Health Sciences MOH, located in Nablus-West Bank Palestine with a total capacity of around 300 university students. The researcher chooses these settings because working on them.

### **2.3. Subjects**

A purposive sample was used in the study. The students were chosen as a total number of 185 (65 from IBN Sina and

120 from An-Najah) through the year 2016/2017, the study sample included 117 students, from both previous settings according to inclusive criteria: university male and female students who enrolled in fourth academic years, and accepted to participate in the study & excluded 50 students with normal weight according to BMI, also 10% (18) students were chosen randomly as a pilot study.

#### 2.4. Tools of Data Collection: Three Tools Were Used

First tool: A Self-Administered Questionnaire: It was developed by the researcher based on the recent related literature review and experts' opinion. It included four parts:

Part One: Socio-demographic characteristics such as age, sex, marital status, place of residence, monthly income, number of family member and number of rooms

Part two: Assessing university student's knowledge was used pre/post application of HBM about obesity, was composed of 6 items as; meaning, causes, causes during the study, complication, the method of weight reduction & types of exercises which help in weight reduction. A correct answer scored one and each incorrect answer scored zero, a total of 50% and above was considered satisfactory and less than 50% were considered unsatisfactory and nutritional habits, and its consequence.

Part three. Assessing university students used were pre/post program regarding nutritional habits and its consequences. It was composed of 10 items as numbers of meals, component of healthy diet, most healthy way of cooking, the main food groups, high carbohydrate, fiber, and calories of food, type of food contain calcium and advice for control fat; a correct answer scored one and each incorrect answer scored zero, a total of 50% and above were considered satisfactory and less than 50% were considered unsatisfactory.

Part four: Assessing university student's practices pre/post program about healthy food and regular exercises.

Scoring system:

A. Healthy food: it was composed of 16 items, each item has been scored as 2 score =always, sometimes, 1=one score and rarely =0, and the total optimal score = 33.

B. Regular exercises: it was composed of 13 items, each item has been scored as 2 score =always, sometimes, 1=one score and rarely =0, and the total optimal = 26.

Total student practices were classified into the following scale always >75%, sometimes 50% and more, while rarely <50%.

Part five: Assess the effects of obesity on student life style used pre/post program implementation. It was composed of 20 item regarding their physical health, self -esteem and social distress.

Scoring system:

Physical health, it was included 9 items, self-esteem included 5 items and social distress included 6 items. Always score 1, sometimes score 2, and rarely score 3. The total assessment scored 20 points and classified as 50% and above was considered positive style, less than 50% was considered negative style.

Second tool: The health believe model (HBM) sub-constructs which used 7 variables were included in this study

regarding 1-the Perceived threat scale consisted of 9 items about susceptibility (possibility of becoming obese) and severity of obesity (severity of disease resulting from obesity), 2-the perceived benefits scale with 10 items, 3- the perceived barriers scale with 12 items, 4- the cues to action scale with 6 items, 5-the perceived self-efficacy in dietary life scale with 16 items, 6- the perceived self-efficacy in exercise scale with 12 items and 7- Behavioral intention of weight reduction with 5 items.

Scoring system of HBM: Possible responses were measured using a 4-point Likert scale for each variable were "completely disagree", "disagree", "agree", and "completely agree". A score was given for each response from 1 to 4, whereby higher scores indicated a stronger feeling of each variable. According to reliability test, Cronbach's  $\alpha$  of the perceived threat scale was 0.761, 0.859 for the perceived benefits scale, 0.805 for the perceived barriers scale, 0.764 for the cues to action scale, 0.843 for the perceived self-efficacy in dietary life scale, and 0.831 for the perceived self-efficacy in exercise scale. While regarding the behavioral intention of weight reduction was measured using a 5-point Likert scale on five items for possible responses were "completely agree", "agree", "don't know", "disagree", and "completely disagree" "was added because intention could be undecided. A score of 1 to 5 was given to each response, whereby higher scores indicated a stronger intention. The reliability test Cronbach's  $\alpha$  of this scale was 0.843.

Third tool: Anthropometric measurement to detect levels of high risk for obesity and body mass index [22]. Three variables were measured by the investigator, weight, height, and BMI, The height was recorded to the nearest 0.5 cm. The subject stood upright barefooted or in thin socks and bareheaded using a height scale measurement to take height. The Weight was recorded to the nearest 1 Kg using appropriate international standards scales, and 0.5kg standard weight for assessing and adjusting the scales was used. Weight was taken without shoes and with light clothing and body mass index (BMI) is a measure of body fatness. It was calculated by the equation:  $BMI = \text{Weight in Kg} / \text{Height}^2$  in meters.

Scoring system:

According to the BMI & levels of high risk for obesity, the university students were classified into: overweight (not obese) a BMI ranged from 25-29.9 kg/m<sup>2</sup>, obese class I (low-risk) if BMI from 30- 34.9 kg/m<sup>2</sup>, obese class II (moderate-risk) if BMI ranged from 35-39.9 kg/m<sup>2</sup> while obese class III (high-risk) if BMI >40kg/m<sup>2</sup>.

The validity: were tested through 5 experts, from community health nursing department, Faculty of Nursing, Ain Shams University. The reliability was done by Cronbach's Alpha coefficient test which revealed that each of the three tools consisted of relatively homogenous items as indicated by the moderate to high reliability of each tool.

#### 2.5. Pilot Study

It was conducted for 18 students were chosen randomly to evaluate clarity, visibility, applicability, as well as the time required to fulfill the developer tools. According to the

obtained results, modifications such as omission, addition, and rewording were done. The number of the pilot study was excluded from the study sample.

## 2.6. Ethical Considerations

Approval was taken from research of ethics committee, Faculty of Nursing, Ain Shams University. An official permission including the title and purpose of the study was submitted from the concerned authorities in the Faculty of Nursing/ A-Najah National University and IBN Sina College for Health Sciences/Ministry of Health to get an approval for data collection to conduct the study.

## 2.7. Field Work

1. After obtaining the permission the researchers explained the aim of the study scheduled times and frequency of counseling sessions to all selected university student. The collected data took three weeks to assure adherence to selected application model.
2. The actual duration was three months & a half, in the period from October 2016 up to January 2017, "as periods of examination and holidays were excluded".
3. Implementation of the model took 20 hours per week for 16 weeks divided into 5 sessions for theory and 3 sessions for practices, varied in time from (35 min to 2.45min). According to its content and the teaching method will use the lecture group, discussion, teaching material will use Arabic booklet and audiovisual materials.

## 2.8. Program Description

Preparatory phase:

The program included "the application of Health Believe Model among youth at high risk for obesity. This model may be useful to the student particularly regarding the benefits of, and barriers to, intended behavior change. Predict dieting and exercising behaviors of obese youth to predict dietary fat intake. Modifying eating behaviors to control weight and improve health instructions on how to assess each component of the model. The nursing programs were designed by the researcher based on data obtained from pre- assessment tools.

Phase 2: Program developing and implementation:

Education: understand basic knowledge about meaning and causes of obesity & its consequences, methods use for weight reduction, risk factors for obesity.

Diet therapy: (high fiber diet, low- fat diet, high vegetables/fruits diet).

Encourage the university youth to change their practices and beliefs toward weight reduction and importance of BMI measurements. Ideal practices related to taking the healthy food and adequate nutrition, components of balanced diet and guidelines for healthy diet, regular physical exercises including walking for at least 30 min / day.

Program implementation based on conducting session plans using different educational methods, and media in

addition to the use of guiding booklet specifically designed and developed based on university youth assessment need.

Phase 3: Program evaluation:

This phase aimed to evaluate the level of improvement in university student knowledge, health practices, and change their life style to avoid consequences of health problems, social distress & low self -steam through implementation of the program. This was done through giving post- test similar to the pre- test, evaluation administered to study subjects after completion of the program in order to estimate the effect of program on university youth knowledge and practices related to obesity and measuring the effect of applying the health belief model in order to improve their health status and healthy practice.

## 2.9. Statistical Analysis

Data were revised, coded, analyzed and tabulated using the number and percentage distribution and carried out in the computer. Using appropriate statistical methods. The following statistical techniques were used:

Percentage, Mean Value, Standard Deviation, Chi-square (X<sup>2</sup>), T paired test and proportion probability (P-value < 0.05 it is statistically significant difference).

## 3. Results

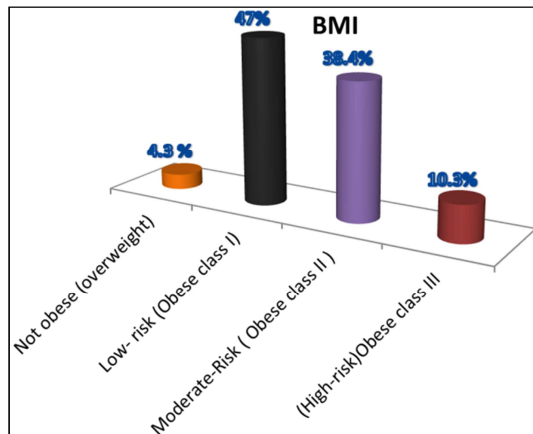
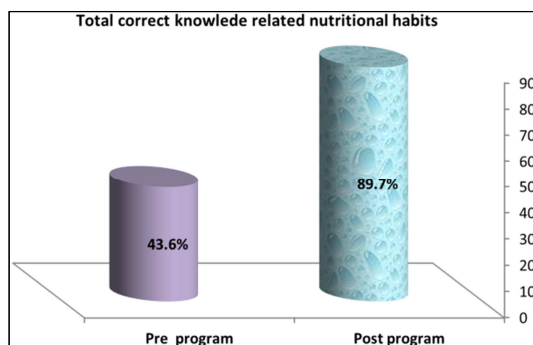
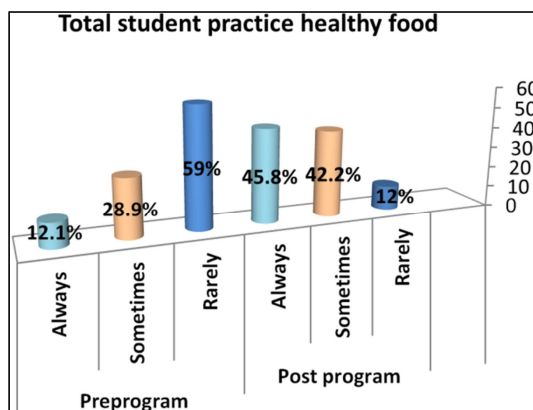
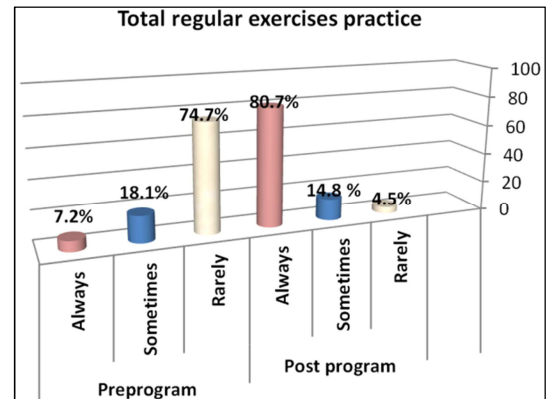
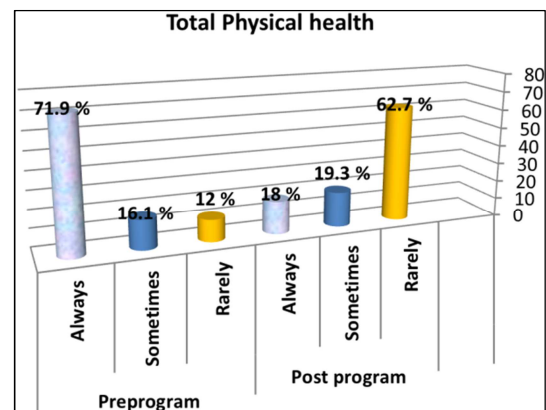
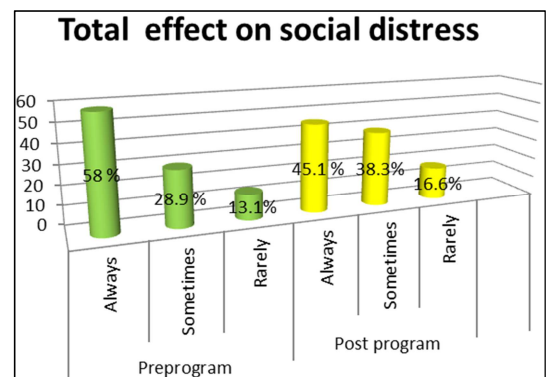
**Table 1.** Distribution of university students according to their socio demographic characteristics (N=117).

Items	NO	%
Age		
20-25 years	106	90.6
>25years	11	9.4
Sex		
Male	31	26.5
Female	86	73.5
Marital Status		
Single	107	91.5
Married	10	8.5
Place of residence		
Urban	37	31.7
Rural	70	59.8
Camps	10	8.5
Monthly Income		
sufficient	3	2.5
sufficient & save	29	24.8
not sufficient	85	72.7
Number of family member		
<3 members	1	1.0
3-5 members	17	14.5
6-8members	63	53.8
>8 members	36	30.7
Number of rooms		
1-3 rooms	35	30.0
<3	82	70.0

**Table 2.** Distribution of university students according to their correct knowledge related to obesity pre/post application of health belief model (N=117).

Obesity knowledge	Pre Program		Post Program		Chi X <sup>2</sup>	P Value
	Correct	%	Correct	%		
Meaning of obesity	40	34.1	112	95.7	10.055	<0.001*
Causes of obesity	39	33.3	99	84.6	42.545	<0.001*
Causes of obesity during study	33	28.2	97	82.9	61.406	<0.001*
Complication of obesity	32	27.4	103	88.0	42.242	<0.001*
Method of weight reduction	45	38.5	117	100.0	104.	<0.001*
Types of exercises which help in weight reduction	45	38.5	109	93.1	13.739	<0.001*
Total knowledge	40	34.1	109	93.1	64.079	<0.001*

\*P value:&lt; 0.001 Significance: HS.

**Figure 1.** Distribution of university students according to their body mass index and levels of high risk for obesity.**Figure 2.** Total correct knowledge of student related to nutritional habits pre/post application of health belief model.**Figure 3.** Total Practices of students according to their healthy food pre/post application of health belief model.**Figure 4.** Total Practices of students according to their regular exercises pre/post application of health belief model.**Figure 5.** Total physical effect of obesity on their physical health pre/post application of health belief model.**Figure 6.** Total effect of obesity on their social distress pre/post application of health belief model.

**Table 3.** percentage distribution of university students according the effect of obesity on their self- esteem pre/post application of health belief model (N=117).

Self- esteem	Preprogram			Post program			Chi-square
	Always	Sometimes	Rarely	Always	Sometimes	Rarely	
	%	%	%	%	%	%	
Less my self-esteem	80.7	9.7	9.6	4.7	18.1	77.2	75.489
Less my self-confidence	61.7	27.4	10.9	11.7	17.4	70.9	32.680
less love for myself	32.1	51.8	16.1	3.6	12.1	84.3	95.492
Afraid of being rejected by others	80.7	9.7	9.6	7.2	18.1	74.7	53.642
Avoid looking in mirrors or seeing myself in pictures	59.0	28.9	12.1	0.0	2.1	97.9	82.506
Total	77.9	14.8	7.3	10.1	11.0	78.9	*127.824

Significantly different at \*P < 0.05, \*\*P < 0.01 and \*\*\*P < 0.001.

**Table 4.** Multiple regressions on behavior intention of weight reduction.

Variables	All		Obese class I		Obese class II		Obese class III	
Dependent variable: Behavior intention of weight reduction								
Independent variables	(R2 = 0.155)		(R2 = 0.182)		(R2 = 0.121)		(R2 = 0.249)	
	β	F	β	F	β	F	β	F
Perceived threat	0.15	2.87*	0.24	2.47*	0.04	0.32	0.03	0.13
Perceived benefits	0.16	0.87	0.07	0.68	0.12	1.80	-0.13	-0.80
Perceived barriers	0.02	0.43	0.02	0.11	0.06	0.95	0.04	0.31
Cues to action	0.32	3.97***	0.17	1.28	0.23	1.95	0.67	2.75*
Perceived self efficacy	0.07*	2.88**	0.11	2.75**	0.06	1.84	0.10	0.91

Significantly different at \*P < 0.05, \*\*P < 0.01 and \*\*\*P < 0.001.

**Table 5.** Mean differences of total correct knowledge and total practices pre/post application of health belief model.

student's knowledge		Practices			
		Mean	$\pm$	SD	T
knowledge related obesity	Pre	6.904	$\pm$	7.561	20.327
	Post	*32.048	$\pm$	8.863	-9.521
Knowledge about Nutritional habits	Pre	2.880	$\pm$	3.458	18.733
	Post	*15.169	$\pm$	5.517	11.135
Total student's Knowledge	Pre	14.108	$\pm$	17.033	24.171
	Post	90.723	$\pm$	26.773	13.518

HS \*P < 0.001.

**Table 6.** Correlation between student's practices and health believe model.

Health Believe Model	Student practices	
	r	P-value
Perceived threat	0.882	<0.001*
Perceived benefits	0.701	<0.001*
Perceived barriers	0.753	<0.001*
Cues to action	0.322	<0.001*
Perceived self efficacy	0.355	<0.001*

HS \*P < 0.001.

Table 1: Shows that 90.6% of the university student's age was ranged from 20 to 25 years old, 73.5%, were female and 91.5% of them were single and 59.8% resident at rural area while, 31.7% live in urban area. Concerning family members 53.8% of them had a family form of 6-8 members, 53.0% had sufficient and save income, meanwhile 72.7% were not sufficient & 70.0% of them lived in more than three rooms.

Figure 1: illustrated that, according to BMI and levels of risk for obesity shows 47.0% of university students were obese class I (low risk for obesity), 38.4% was obese class II (moderate risk), and 10.3% were obese class III (sever risk for obesity) while, only 4.3% of them were overweight.

According to the research hypothesis, the researchers

hypothesized that the youth who received health belief model would expect to improve their knowledge and practices about obesity as indicated by pre and post application of model.

Table 2: Reported that 34.1% of university students had a correct answer for the meaning of obesity pre- application of the model changed to 95.7% post program implementation, 84.6% had correct knowledge for causes, 88.0% for complication, and 93.1% for types of exercises which help in weight reduction post program implementation with high statistical significance difference pre /post application of model at P value <0.001.

Figure 2: Reveals that the total correct knowledge of university students related to nutritional habits were 43.6% had correct knowledge pre -application of HBM while, changed to 89.7% post program implementation with highly statistically significant differences at P value <0.001.

Figure 3: illustrated that total university student's practice regarding taking healthy food was (12.1%, 28.9%) had always & sometimes taking healthy food pre- program respectively changed to (45.8% & 42.2%) post -HBM application with highly significant difference pre, post -application of model at P<0.001.

Figure 4: Describes that 7.2%, 18.1% of university youth

had always & sometimes practice of regular exercises pre-application of model while improved to 80.7% & 14.8% post- program respectively. There was a highly significant difference between youth student's practices regarding exercises pre/ post -HBM application at  $P < 0.001$ .

Figure 5: illustrated that 71.9% & 16.1% of university students had always and sometimes total physical effect of obesity on their physical health pre- program while changed to 18.0% & 19.2% post- program. There was a highly significant difference between student's practices pre and post- HBM at  $P < 0.001$ .

Table 3: Describes that the total effect of obesity regarding their self- esteem the study reported 77.9%, & 14.8% of student's had always & sometimes effect while changed to 78.9% of students had rarely effect post- program. There was a highly significant difference between pre /post- HBM application at  $P < 0.001$ .

Figure 6: reveals that the total effect of obesity regarding their social distress this table reported 58.0%, of student's had always social effect while post- HBM application changed to 16,6% were rarely effect with a highly significant difference between pre & post- HBM application at  $P < 0.001$ .

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Table 4: Shows that the students' stepwise multiple regressions were conducted to determine the relative importance of the variables of the HBM to the behavioral intention of weight reduction. When perceived threat, perceived benefits, perceived barriers, cues to action, and perceived self-efficacy (in dietary life and exercise) were regressed against behavioral intention, the model was highly significant even though it explained a relatively small variance  $R^2 = 0.155$ . While perceived benefits and perceived barriers were not significant, perceived threat ( $P < 0.01$ , cues to action  $P < 0.001$ , and perceived self-efficacy  $P < 0.01$  were significantly associated with behavior intention of weight reduction. Cue to action seemed to be the most important among these three variables.

Table 5: Shows highly significant improvement in student's total correct knowledge regarding obesity, nutritional habits and their practices post -HBM application with highly statistically differences at  $P < 0.001$ .

Table 6: Illustrate that positive correlation between student's practices and improve their selected health believe model with highly statistically differences at  $P < 0.001$ .

## 4. Discussion

Obesity is now well recognized as a disease in its own, one which is largely preventable through changes in lifestyle. The prevalence of obesity defined as a BMI of  $\geq 30$  is increasing worldwide and is regarded as one of the biggest challenges for public health. According to the WHO, there were about 2.3 billion overweight people aged 17 years and above, and over 700 million obese people worldwide in 2015 [23, 15].

According to socio-demographic characteristics of the university student's, the present study reveals that most of the

student's age was ranged from 20 -25 years old, more than two -third were female. This finding in the same line with the study about Prevalence and correlates of obesity and central obesity among Omani adults by [24] who stated that the highest obesity prevalence 42.1% was in the age group 18-40 significantly higher than the other age groups, being overweight and obesity were increasing with age. Concerning family members and their income, this study revealed that more than half of them had the family form of 6-8members & 53.0% had sufficient and save income. This finding agrees with the results of the study about overweight and obesity among adolescence Children in Jordan: Prevalence and Associated Factors by [25] who find that the daily pocket money was associated with overweight, while family monthly income associated with obesity. Also this result in the same line with the results of the study about Obesity, metabolic syndrome, and cardiovascular disease in the USA by [26] who studied that the prevalence of obesity in the United States is lower among those of higher socioeconomic status. This may be high economic index were more likely to be overweight and obese. Also disagree with other studies, about the socio- demographic correlates of nutritional status of adolescents in Palestine by [27] who find that the mean family size in Palestine is 5.7% however, it was larger in this study 8.1% in Ramallah and 8.9% in Hebron as the sample represents a selected segment of families that have progressed further into their life cycle. Small family size was associated with overweight/obesity; and disagree with [28] who studied obesity and relation with family size cross-national USA study reported that the prevalence of obesity in the United States is lower among those of small family number and stated that there exists a negative correlation between family size and obesity prevalence for student. This could be due to the fact that smaller families had better food availability.

Regarding body mass index of university students and levels of high risk for obesity the current study reveals that less than half of them were obesity class I, (low risk of obesity), more than one -third was obesity class II (moderate risk), one tenth were obesity class III or sever risk for obesity while less than one- tenth of them were overweight. This finding agrees with the results about of studies from Kuwait and Saudi Arabia indicated a range of adolescent overweight/obesity using NCHS/WHO reference between 35-45%, while in Palestinian study on 2131 survey which was conducted among Palestinian adolescents aged 18-25 years in 2013/2014 reported that the overweight/obesity of 20.4% among boys and 23.0% among girls [28]. This trend was opposite to what was found in a study about the effects of television on metabolic rate, the potential implication for adults obesity by [29] who mentioned that the prevalence of overweight/obesity was 15.0% among boys and 18.3% among girls in the USA adolescents. However, such a comparison must be taken with caution as the Palestinian study among adolescents & used self-reported weights and heights while in this study, reported that the weights and heights were measured. Self-reported data underestimate



overweight prevalence especially among girls and overweight adolescents [30], also moreover, the findings concur with the about earlier reports of trends in obesity by National Center for Health Statistics [31] reported that the Prevalence of obesity among adults and youth in the United States, 2011–2014 shows that no increase among youth since 2003–2004, but trends do show increases in both adults and youth from 1999–2000 through (2013–2014). there were no significant differences between (2011–2012) and (2013–2014) were seen in either youth or adults.

Based on research hypotheses and application of HBM:

In relation to students knowledge related to obesity and levels of risk for obesity, the current study represented that the total correct knowledge of students related to obesity, there were more than one third pre- program while changed to the majority of them their knowledge improved post – application of HBM with highly significant differences pre /post program. This finding disagrees with the results of the study about the obese student attending weight-management clinics in the United Kingdom by [32] who find that the obese adolescence had poor knowledge about the health risks of obesity. Also this finding contradicted with the results of the study about weight reduction practices and its effects on the nutritional status of Saudi females attending weight reduction clinics in Riyadh City by [33] who reported that in his study, the university college obesity reported that 9.9% of them had the good knowledge, while 56.1% and 34% had fair and poor knowledge levels at pretest period. At posttest still, those who had the good level of knowledge represented the least proportion 10.8% and this may be referred to most of the sample were study in university.

Concerning student knowledge about nutritional habits and its consequences on health during adolescence stage, the current study reveals that the total correct knowledge of students reported that less than half of them had correct knowledge pre -program implementation, while changed to most of them post- application of model with highly statistically significant differences pre/post program for students among weight reduction methods, this finding disagree with a study about obese youth in Taiwan 18-25 years old and participated in a fitness program and reported that obese youth consume high-fatty food habits and high-sugar food habits this study reported by [34]. This may be due to less of health educations program conducted by health care providers to prevent obesity regarding youth.

In relation to university students practices according to their regular physical exercises pre/post program, the result describes that less than one- quarter of university student's had always & sometimes practice of regular exercises pre program while, increase to more than two- third post-application of HBM regarding total regular exercise and there was a highly significant difference between youth student's practices regarding exercises pre, post nursing program. This finding goes with the results of the study about obesity among people in the USA by [35] who studied reported that there were significantly greater improvements in the health transition, for the participants in physical

activity group compared to participants in the controlled group. Also, the same result agrees with [36] who mentioned that a study about the morbid youth obesity in the Kingdom of Norway reported statistically significant improvement in physical activity, self-care & activities during the 12- month follow-up. This may be due to that the majority of student's wide availability of indoor food stimuli, not interested to do daily exercise & physical activity to improve their lifestyle.

According to the effect of obesity on their physical health and self- steam the present study shows that more than two-thirds of university student had always and sometimes total physical effect of obesity on their physical health pre program & changed to more than one- third, while more than half of students had always social effect & also post-application of HBM changed to less than one -quarter were rarely effected with a highly significant difference between pre & post program. The findings disagrees with the results of the study about obesity among Portugal students by [37] who studied found that all variables, were different ( $p < 0.001$ ) between normal-weight and overweight/obese students. For body image, worse psychosocial scores were observed linearly with higher obesity levels. Self-esteem was lower in overweight and obese youth in comparison with normal-weight youth, with no statistical difference.

According to the Health Belief Model & Relation between the studies variables. This study was conducted to investigate behaviors about weight reduction and factors influencing behavioral intention by applying the HBM among university students.

In relation to the students' perceived self-efficacy in dietary life and exercise the current study weren't shows significant differences among students. This result in consistent with the results of other studies about dietary attitude, dietary self efficacy and nutrient intake among students with different obesity indices in Korean by [38] who mentioned that when the obesity rate was high, self-efficacy was low, also disagree with the results of a study about the self efficacy and health promoting behavior between obese and normal weight adolescence students, in Korean by [39] who shows that when the obesity rate was high, self-efficacy was low. As regarding the perceived threat, cues to action, and perceived self-efficacy were the significant variable to predict behavioral intention of all respondents. Cues to action seemed to be the most important among the three variables. Cues to action refer to influences of social environment such as family, friends, mass media, and boyfriends. Again, social environment could be an important factor affecting adolescent's weight reduction behavior. For the overweight group, perceived threat and perceived self-efficacy were the significant variables. For the obese class I group, cue to action was the significant variable. This result disagree with other studies done by [40, 33] in their study about factors influencing weight control intention of obese adolescents in Korean shows that the perceived benefit was the most important variable. This might be due to other variables affecting students' behavior of weight reduction. Also disagree with other studies done on body image and



influences on the intention to reduce food intake of female students [master's thesis] by [41], also another result done by [42] in his study about factors affecting the weight control intention of the female adolescent, in Korean and reported that dissatisfaction with the body was the most important variable that influences weight control while in the same line with [43] who reported that the study about Psychosocial factors associated with dieting behaviors among female adolescents, insisted that self-esteem was the strongest contributing factor differentiating dieters and non-dieters.

## 5. Conclusion

Based on the current study results and research hypothesis, the following can be concluded:

the current result shows that there was a highly significant improvement in student's total correct knowledge regarding obesity, nutritional habits and their practices post-HBM application with a highly statistically differences at  $P < 0.001$ , also accordance to the total effect of obesity on students self steam and social distress the study reported there was a highly significant difference between pre/ post application of HBM, In conclusion, the significant variables to predict behavioral intention of weight reduction were perceived threat, cues to action, and perceived self-efficacy. It is desired for overweight students to properly increase the threat of obesity, social influences, and self-efficacy for weight reduction.

## 6. Recommendations: The Finding of the Present Study, Suggested the Following Recommendations

1-Provide culturally appropriate health education programs for promoting physical activity especially among university students regarding nutritional habits, and its consequence, method of weight reduction & types of exercises, also continuously monitor the numbers of overweight and obese student with a national register for obesity.

2-Follow up periodically for overweight or obese student and continuous health education programs for them to enhance their life style practices to reduce the prognosis of the disease.

3-regarding the HBM also suggests that the benefits and barriers of changing health behavior must be taken into consideration, as those who perceive more benefits than barriers are more likely to take action. In addition, self-efficacy, or the belief in one's ability to achieve a desired result, has recently been added to the HBM, as a significant amount of literature posits that individuals with higher self-efficacy are more likely to incorporate health behavior changes.

4-Finally it is important to explore whether measuring current Health Beliefs would impact different health behaviors. Eating healthy food and doing physical activity-

the key components of this study-are easy and highly controllable behavior.

## Further Researches on

1. Investigate contributing factors of obesity to improve understanding and management.
2. Conduct experimental research on Nutritional therapy and physical activity to improve obesity management especially regarding adolescence stage.
3. Examine the relationship between body mass index and health related life style.
4. further research the impact of self-efficacy on training and guidance methods, goal setting practices and individualized training programs.

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