

## Effect of Educational Intervention Based on Health Belief Model among High-Risk undergraduate nursing students for Obesity

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### Abstract

Overweight and obesity are risk factors for the development of chronic diseases with at least 2.8 million adults dying each year as a result of being overweight or obese. **Aim:** Determine the effect of educational intervention based on the health belief model among high-risk undergraduate nursing students for obesity. **Research design:** A quasi-experimental research design pre-post-test was utilized in this study. **Settings:** The study was conducted at the Faculty of Nursing at Mansoura University. **Subjects:** A purposive sample composed of 160 undergraduate nursing students who are at high risk for obesity was included. **Tools of data collection:** **Tool (I):** A Self-administered questionnaire, was composed of 4 parts, **part one:** Undergraduate nursing students' data, **and part two:** Undergraduate nursing students' knowledge regarding obesity. **Part three:** Undergraduate nursing students' self-reported practices regarding healthy food and regular exercise. **Part four:** The effects of obesity on undergraduate nursing students' lifestyle assessment sheet. **Tool (II):** The health belief model assessment sheet. **Tool (III):** Anthropometric measurement to detect body mass index. **Results:** Revealed that more than two-fifths of undergraduate nursing students were in obesity class I, and two-fifths were in obesity class II. There was a highly significant difference between undergraduate nursing students' knowledge & their practices regarding obesity, healthy food, and exercises pre & post-educational intervention based on the health belief model. **Conclusion:** The study concluded that educational intervention based on the health belief model has a positive effect on improved knowledge and practices among high-risk undergraduate nursing students for obesity. **Recommendations:** The study suggested that the educational intervention based on the health belief model should be integrated into care among high-risk undergraduate nursing students for obesity. Conducting routine screening by measuring body mass index for undergraduate nursing students who are at high-risk for obesity.

**Keywords:** Educational intervention, Health belief model, Obesity, Undergraduate nursing students.

### Introduction:

Obesity is described as a condition in which there is an excess of body fat that causes health problems. Body Mass Index (BMI) 30.5 (kg/m<sup>2</sup>) is the clinical definition for adults. Obesity is now a huge public health issue and a major concern since its incidence is increasing quickly not only in industrialized but also in emerging countries (Barker, 2019).

College student weight gain is a national public health issue related to the current obesity pandemic. According to the National Collegiate Health Risk Survey, one in every five college students was overweight, and there was a threefold increase in young adults ages 18-29 classed as obese class III [BMI 40] (Brooks et al., 2018). Overweight and obesity-related health issues (diabetes, heart disease, hypertension, stroke, and some malignancies)

are preventable and might be avoided with good nutrition and physical activity (Tringler et., 2019).

Weight gain and nutrition habits among college students have become major health problems for campuses across the country. According to the 2010 National Collegiate Health Risk Survey in the United States, one in every five college students was overweight, and there was a reported threefold increase in young adults ages 18-29 classed as obese class III - BMI 40 (Brooks et al., 2018). This gain in weight during the college years, particularly freshman year, has been linked to the substantial changes that a college student goes through during the transition from high school to college. This shift comprises a change in surroundings, constraints or lack thereof, social norms and exposures (alcohol, tobacco, drugs,

sexual activity, etc.), and behaviors (Holm et al., 2020).

This increase in weight change is the result of multiple contributors, including 1) food composition and eating behaviors, 2) increased restaurant eating, 3) increased portion sizes, 4) increased unhealthy snacking, 5) increased saturated fat consumption, 6) increased television viewing, 7) decreased physical activity, and 8) a lack of appropriate duration and quality of sleep (Moreno et al., 2019 and Dolinsky et al., 2019). (2019).

College students' weight change is influenced by physical inactivity. Adults require at least 150 minutes of moderate-intensity aerobic activity per week, at least four days per week, and two or more days per week of muscle-strengthening activities. Moderate-intensity aerobic activity includes brisk walking, water aerobics, riding a bike on level terrain, pulling a lawn mower, and other activities. Lifting weights, using resistance bands, utilizing body weight for resistance (push-ups and sit-ups), heavy gardening, or yoga are all examples of muscle-strengthening exercises (CDC, 2021).

The health belief model has been used to investigate health behavior predictors among college students. The HBM has been widely utilized to explain individual change and maintenance of health-related behaviors, as well as a framework for health treatments (Champion & Skinner, 2013). After searching the current literature, four research - two cross-sectional and two correlational - that employed the HBM as a framework to characterize or change weight or dietary behavior were found. Several HBM components, including self-efficacy, were consistently associated with weight loss and management behaviors in these trials. Vonah et al., (2019) perceived threats, perceived benefits, perceived barriers, and perceived susceptibility and severity. Several HBM components have also been used in college-based interventions targeted at improving health behaviors such as alcohol consumption, smoking, physical activity, and nutrition.

Based on the impressionability and potential for positive adherence of college students, nursing interventions may have the

greatest impact when applied at the college-age level (Ha & Caine-Blish, 2020). Class-based treatments are an effective method of influencing college students' health practices. It is also recommended that these therapies include goal setting, planning, and self-monitoring eating and physical activity habits to address the mediators of weight gain. The Health Belief Model (HBM) has been used to better understand or improve dietary habits and/or weight (Strong et al., 2019).

#### **Significance of the study:**

The increased prevalence of obesity is a rising public health concern in Egypt 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 including higher levels of triglycerides, low-density lipoprotein (LDL; bad cholesterol), and blood sugar levels, as well as lower levels of high-density lipoprotein (HDL; good cholesterol) and tissue responsiveness to insulin. 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 (Screening for Obesity, 2019).

The prevalence of obesity has risen in developed, under-developed countries and the Arab world. WHO report discovered that 30% of the population in the Arab World is overweight or obese, including adolescents and adults. In Oman, the prevalence of obesity reached 16.7% in men and 23.8% in women, in Egypt 48%, and in UAE 42%. Countries such as Bahrain at 37.9%, Jordan at 37.9%, Saudi Arabia at 36.4%, and Lebanon at 27.4% have higher obesity rates among females (Kahan, 2019).

Nurses, especially those who work in primary care settings, are in a strategic position to 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. The CHN must provide counseling to those persons who are at particular risk of overweight /obesity. 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, and how to do it without effect on their health (Gillis, 2016).

### **Aim of the study**

The study aimed to determine the effect of educational intervention based on the health belief model among high-risk undergraduate nursing students for obesity through:

1. Assessing high-risk undergraduate nursing students' knowledge and practice regarding obesity.
2. Developing and implementing educational intervention based on the health belief model for obese nursing students, according to their needs.
3. Evaluating the effect of educational intervention based on the health belief model on improving the knowledge and practice of nursing students.

### **Research Hypotheses:**

**Hypothesis (1):** High-risk undergraduate nursing students' knowledge about obesity will be improved after the application of educational intervention based on the health belief model than before.

**Hypothesis (2):** High-risk undergraduate nursing students' practice about obesity will be improved after the application of educational intervention based on the health belief model than before.

### **Subjects and Methods:**

#### **Research design:**

A quasi-experimental research design pre-post-test was utilized in this study.

#### **Setting:**

The study was applied in the Faculty of Nursing, at Mansoura University.

#### **Subjects**

**Sample type:** A Purposive sample was used.

**Sample size:**

A purposive sample composed of 160 undergraduate nursing students who are at high risk for obesity enrolled in the fourth academic year.

#### **Sample size calculation:**

The sample size was calculated based on considering the level of significance of 5%, study power of 80%, and by using the following formula:  $n = [2(Z \alpha/2 + Z \beta) \times p(1-p)] / (p_1 - p_2)^2$ . This depends on power, for 80% this is 0.84,  $n = [2(1.96 + 0.84) \times 0.55(1-0.55)] / (0.2)^2 = 160$ . Based on the previously mentioned formula, 160 high-risk individuals were recruited.

#### **Inclusion criteria included:**

- Undergraduate nursing students who are at high risk for obesity
- Their age from 22-25 years old
- From both sexes
- Agree to participate in this study.

#### **Exclusion criteria included:**

- Presence of associated chronic diseases

#### **Tools of data collection:**

**Three tools were used for data collection.**

#### **Tool (I): A Self-Administered Questionnaire:**

It was developed by the researcher after reviewing related literature (Ha & Caine-Blish, 2020 Strong et al., 2019). Data pertinent to the study were collected using the following tools; which included four parts:

**Part (1):** Undergraduate nursing students' characteristics such as age, sex, residence, their body mass index.

**Part (2):** Undergraduate nursing students' knowledge regarding obesity, was designed to assess undergraduate nursing students' knowledge about obesity (pre/post) application of HBM. It was composed of 15 items such as; the meaning of obesity, complication, method of weight reduction & types of exercises which help in weight reduction, nutritional habits such as numbers of meals, components of a healthy diet, most healthy way of cooking, the main food groups, type of food contain calcium, a complication of obesity, and advice for control fat.

### Scoring System for knowledge:

A correct answer scored one and each incorrect answer scored zero, a total of 60% and above was considered satisfactory and less than 60% were considered unsatisfactory.

**Part (3):** Undergraduate nursing students' self-reported practices regarding healthy food and regular exercises: It was designed to assess Undergraduate nursing students' practices (pre-post) application of HBM It was composed of items regarding healthy food and regular exercises.

### Scoring system for practices:

**A. Healthy food:** it was composed of 17 items and answers were coded according to the following: always = 2 scores, sometimes = one score, and rarely = 0, and the total optimal score = 30.

**B. Regular exercises:** it was composed of 13 items and answers were coded according to the following: always = 2, sometimes = one score and rarely = 0, and the total optimal score = 25. Total students' practices were classified on the following scale, adequate practices >60% while inadequate practices <60%.

**Part (4):** The effects of obesity on undergraduate nursing students' lifestyle assessment sheet: it was designed to assess the effects of obesity on students' lifestyles. It was composed of 15 items regarding their physical health and social distress (pre-post) application of HBM.

Physical health, it was included nine items and social distress included sex items and answers were coded according to the following: Always = one score, sometimes = 2, and rarely = 3. The total assessment scored 15 points and classified as 50% and above was considered a positive style, and less than 50% was considered a negative style.

**Tool (II):** The health belief model (HBM) assessment sheet, which used seven variables was included in this study regarding obesity (Janz and Becker, 2013).

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 for HBM:** Possible responses were measured using a 4-point Likert scale for each variable was "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 toward each variable. According to the 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 the behavioral intention of weight reduction was measured using a 5-point Likert scale on five items for possible responses that 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.

**Tool (III):** Anthropometric measurement to detect body mass index (DHSCDP, 2020). 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 a 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, undergraduate nursing students were classified into: overweight a BMI from 25-29.9 kg/m<sup>2</sup>, BMI from 30- 34.9 kg/m<sup>2</sup> obese class I, BMI from 35-39.9 kg/m<sup>2</sup> obese class II, and BMI >40kg/m<sup>2</sup> were obese class III.

**Validity and reliability of the tools:**

The content validity was tested for clarity, comprehensiveness, and appropriateness, and reviewed by five professors' experts in community health nursing with more than ten years of experience. No modifications were done. The reliability of the tools was assessed through Cronbach's alpha test was  $\alpha = 0.891$  for the first tool,  $\alpha = 0.83$  for the second tool,  $\alpha = 0.78$  for the fourth tool, and  $\alpha = 0.76$  for the fifth tool.

The study to be completed passed through different phases including preparatory, implementation, and evaluation phases.

**Preparatory phase:**

A review of recent, current, national, and international related literature on various aspects of the problems to design the study tools, then tools of data collection were tested for content validity through a pilot study to determine the undergraduate nursing students' needs by using pretest based on the collecting data on the students' knowledge and their practices.

**Pilot study**

A pilot study was carried out on 10% of the sample (16) high-risk undergraduate nursing students to observe the clarity and testing of the feasibility of the research process. No modifications were done. High-risk undergraduate nursing students included in the pilot study were excluded from the study.

**Ethical considerations:**

Before starting the research, official permission was obtained through an issued letter from the Dean of the Faculty of Nursing after clarifying the purpose of the study and taking the approval. Written consent was obtained from the high-risk undergraduate nursing students to participate in the study after the aim of the study was explained to them.

The researchers informed the high-risk undergraduate nursing students that, the study was voluntary, they were allowed not to participate and they had the right to withdraw from the study at any time, without giving any reason. Moreover, they were assured that their information would be confidential.

**Implementation phase:**

- After obtaining a permit the researcher started to interview the undergraduate nursing students to explain the aim and educational interventions content, two days per week (Saturday and Monday), from 9 am to 2 pm for data collection pre and post-study.
- Data collection was carried out in the period from March 2021 up to August 2021.
- Implementation of the program took 18 hours per week for 16 weeks divided into 5 sessions for theory and 3 sessions for practice around 9 hours for theory and 9 hours for practice, varied in time from (45 minutes to 60minutes), according to its content and the teaching method was used the lecture group, discussion, teaching material was used Arabic booklet and audiovisual materials.

**Program construction:**

This health belief model was applied to prevent obesity, particularly regarding the benefits of, and barriers to, intended behavior change. Predict dieting and exercising behaviors of obese nursing students to predict dietary fat intake. Also, the model has been integrated into numerous theoretical perspectives for behavior change for preventing obesity.

Modifying eating behaviors to control weight and improve health instructions on how to assess each component of the model. The component measurement is specific to the behavior (i.e., barriers for adolescents attempting to improve eating habits to prevent obesity will be different from barriers to increasing consumption of vitamin A-rich vegetables). The nursing education programs were designed by the researcher based on data obtained from pre-assessment tools.

**The objective of the educational intervention:**

**General objectives of the program:** by the end of the program implementation each university youth will be able to:

- Acquire basic knowledge about obesity & its consequences.
- Identify basic knowledge related to nutritional habits
- Introduce ideal practices related to taking healthy food & regular physical exercise.

**Specific objectives:**

By the end of each session university students should be able to:

**The theoretical part includes**

- Define obesity.
- List causes of obesity.
- Discuss knowledge about different diseases as health consequences of obesity.
- List methods used for weight reduction.
- Explain risk factors for obesity.
- Identify types of physical exercise.
- List principles of adequate nutrition.
- Explain the components of a balanced diet.
- Mention the importance & objectives of practicing exercises
- Identify BMI.
- Explain the importance of BMI measurements.
- Understand guidelines for a healthy diet.

**The practical part includes:**

- Demonstrate Types of physical exercises.
- Display physical exercises.

Program implementation based on conducting session plans using different educational methods, and media in addition to the use of a guiding booklet specifically designed and developed based on undergraduate nursing students' assessment need methods: small group activities those who were assigned to group teaching were randomly divided into ten groups between (16) in each group. Information and skills for each group at the end of the teaching experience were revised. Time was opened for attendance to ask questions and to receive the corresponding answers as well as to express their feedback toward the teaching session. The media used posters, laptops, guidance booklet which includes instruction and information for

undergraduate nursing students as a reference during and after the educational intervention.

At the beginning of the first session, orientation about the program and its purposes was given. It was agreed at the time of the sessions with the undergraduate nursing students. From the second session and so on each session started with a summary of what was given through the previous sessions and the objectives of the new one.

By the end of each session, a summary was made and time was allocated for questions and answers & plans for the next session were made. Except for the last session, the termination of sessions through feedback was done.

**Phase 3: Evaluation phase:**

This phase aimed to evaluate the level of improvement in undergraduate nursing student knowledge, practices, and lifestyle. It was conducted two months after the implementation, this was done by giving a post-test similar to the pre-test, evaluation administered to study subjects after completion of the educational intervention to determine the effect of educational intervention based on the health belief model among high-risk undergraduate nursing students.

**Administrative Design:**

Official permission including the title and purpose of the study was submitted from the concerned authorities in the faculty of nursing/ Mansoura University to get approval for data collection to conduct the study.

**Statistical Design:**

Data were revised, coded, analyzed, and tabulated using the number and percentage distribution and carried out on the computer using appropriate statistical methods version 20. Percentage, Mean Value, Standard Deviation, Chi-square (X<sup>2</sup>), T paired test, and proportion probability (P-value) when  $P > 0.05$  it is a statistically not significant difference when  $P < 0.05$  or  $< 0.02$  it is a statistically significant difference when  $P < 0.01$  or  $P < 0.001$  it is a highly statistically significant difference.

**Results:**

**Table (1):** This represents that 63% of the studied high-risk undergraduate nursing

students' age ranged between 22 and < 23 years, and 77% of them were females. From the same table, it is pointed out that 79% of high-risk undergraduate nursing students were living in urban areas.

**Figure (1):** illustrates that 48.75 % of undergraduate nursing students were obese in class I, 32.5% were obese in class II, 12.5% were obese in class III and only 6.25% of them were overweight.

**Table (2)** reported that students' correct knowledge regarding obesity and nutritional habits, one-third of them had the correct answer for the meaning of obesity pre-educational interventions changed to almost all post-educational interventions implementation with high significance at a P value <0.001.

Regarding the total correct knowledge of undergraduate nursing students related to obesity in **Figure (2)**, the figure shows that there were 37% of them had total knowledge of pre-educational interventions while improved to 97% post educational interventions implementation with high significance at P value <0.001 .'

**Table (3):** Describes those undergraduate nursing students' practices had improved post-educational interventions implementation compared to pre-application of the educational interventions. There was a highly significant difference between undergraduate nursing students' practices pre and post-application of the educational interventions at P<0.001.

**Figure (3):** Describes that there was a highly significant difference between undergraduate nursing students' practices pre and post-application of the educational interventions at P<0.001.

**Figure (4):** illustrated that 79% of undergraduate nursing students had always a total physical effect of obesity on their physical health during pre-educational interventions while changing to 15% post-educational interventions. There was a highly significant difference between students' practices pre and post-application of HBM at P<0.001.

**Figure (5):** reveals the total effect of obesity on undergraduate nursing students' social distress this table reported that 69.0%, of

students, always had a social effect while post application of the program changed to 19% was rarely effect with highly significant difference between pre & post application of HBM at P<0.001.

**Table (4):** Demonstrates that the mean score of total perceived threat did not differ significantly between the entire group and the three types of the obese group at P <0.05. It reveals that the mean score of the overall perceived benefits they could gain by losing weight for all undergraduate nursing students was 2.97 0.45, with significant differences between the three groups at P <0.05. The mean score for all students for overall perceived barriers to weight loss was 2.34 0.41, with significant variations between the three groups at P < 0.05. The mean score of all cues to action for weight loss for all nursing students was 2.76 0.43. At <p 0.05, there were no significant differences between all groups. The mean score of total self-efficacy in nutritional life for all students was 2.92 0.45, with significant differences between the three groups at <p 0.05. The mean score of total self-efficacy in exercise for all nursing students was 2.82 0.47, similar to self-efficacy in a nutritional life, with significant differences between the three groups at p <0.05. The mean score of total intention for all students was 3.14 0.84, with significant variations between the three groups at p < 0.05.

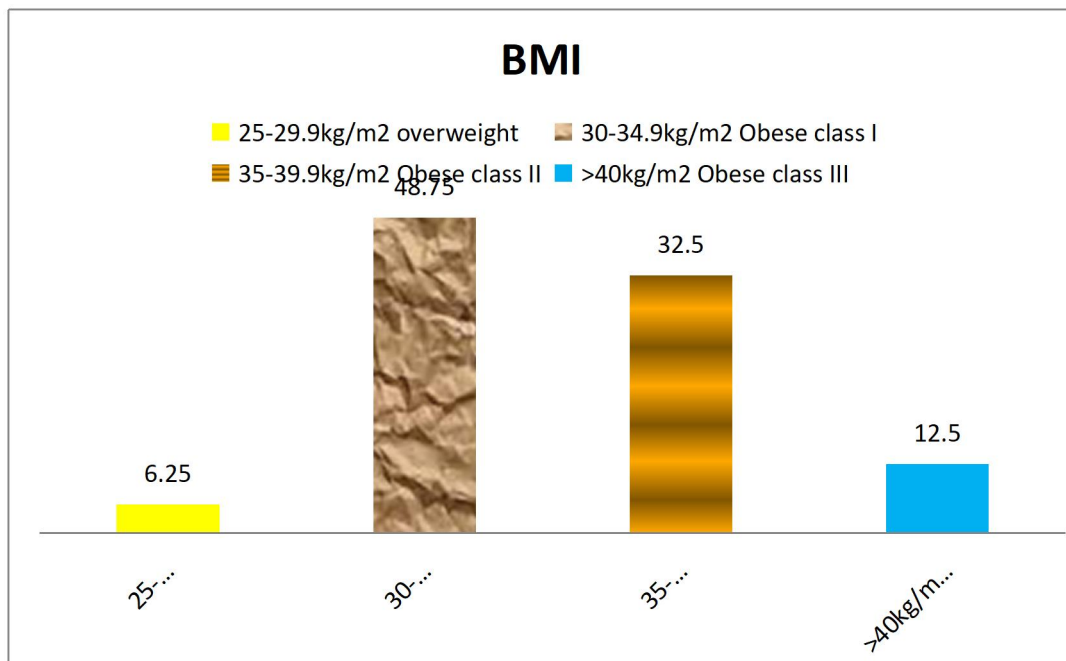
**Table (5)** demonstrates that the students' multiple regressions were carried out to establish the relative impact of the factors of the health belief model on the behavioral intention of weight reduction. Table 5 summarizes the findings. When perceived threat, perceived advantages, perceived barriers, cues to action, and perceived self-efficacy (in dietary life and exercise) were regressed against the behavioral intention, the model was highly significant, while explaining only a small proportion of the variation ( $R^2 = 0.156$ ). While perceived advantages and perceived barriers were not significant, perceived threat P <0.05, signals to action P <0.001, and perceived self-efficacy P <0.01 were substantially connected with weight loss behavior intention. The most crucial of these three elements appeared to be the cue to action.

**Table (6):** Shows a highly significant improvement in undergraduate nursing students' correct knowledge regarding obesity, nutritional habits, and their practices post application of the health belief model with highly statistically differences between pre/post educational interventions at  $P < 0.001$ .

**Table (7):** Illustrate the positive correlation between undergraduate nursing students' practices and improving their selected health belief model post application of the educational interventions at  $P < 0.001$ .

**Table (1):** Distribution of studied high-risk undergraduate nursing students according to their characteristics (n=160)

Items	No.	%
<b>Gender</b>		
- Male	59	37
- Female	101	63
<b>Age in years</b>		
21 < 22	37	23
22 < 23	123	77
<b>Residence</b>		
- Rural	34	21
- Urban	126	79



**Figure (1):** Distribution of undergraduate nursing students regarding their body mass index (N=160)

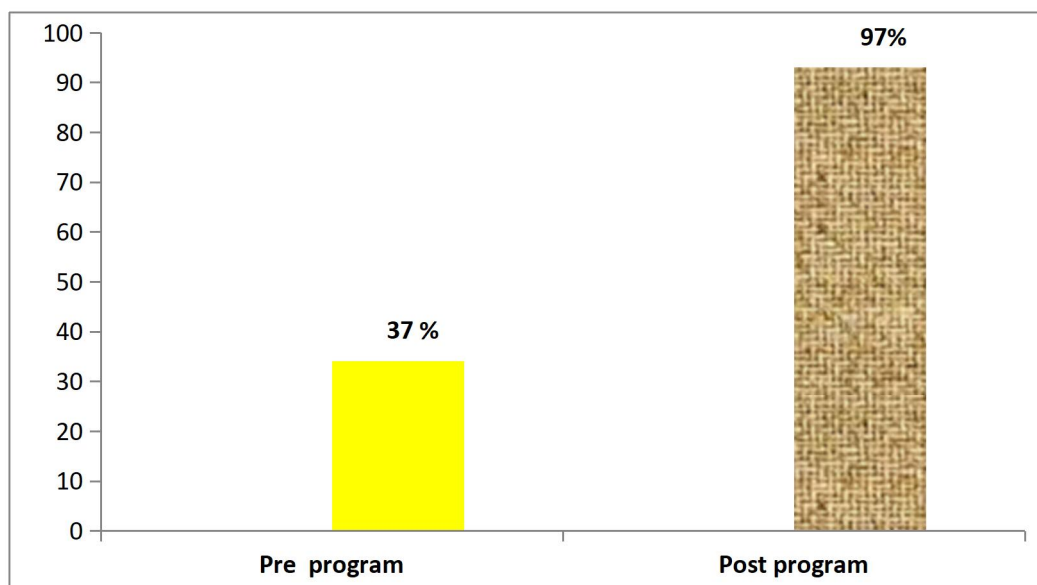


**Table (2):** Distribution of undergraduate nursing students according to their correct knowledge response about obesity and nutritional habits pre/post HBM application (N=160).

Knowledge items	Pre HBM application		Post HBM application		Chi X <sup>2</sup>	P Value
	Correct		Correct			
	No	%	No	%		
Meaning of obesity	42	67.2	152	95	12.06	<0.001*
Causes of obesity	38	60.8	154	96.25	43.34	<0.001*
Causes of obesity during study	30	48	156	97.5	63.40	<0.001*
Complication of obesity	30	48	143	89.37	45.24	<0.001*
Method of weight reduction	40	64	157	98.12	103.2	<0.001*
Types of exercises that help in weight reduction	40	64	149	93.12	14.73	<0.001*
Numbers of meals recommended daily	70	112	157	98.12	57.8	<0.001*
Component of a healthy diet	50	80	149	93.12	64.3	<0.001*
A most healthy way of cooking	43	68.8	143	89.37	93.2	<0.001*
The main food groups	30	48	158	98.75	48.5	<0.001*
Types of food that contain a high percentage of calcium	54	86.4	157	98.12	48.4	<0.001*
Complication of obesity	70	112	155	96.87	47.3	<0.001*
Susceptibility to complication	30	48	149	93.12	76.2	<0.001*
Advice for controlling fat	35	56	156	97.5	63.4	<0.001*

\*P value :&lt; 0.001

Significance :HS

**Figure (2):** Distribution of undergraduate nursing students according to their total correct knowledge related to obesity and nutritional habits**Table (3):** Percentage distribution of undergraduate nursing students' practices regarding their taking healthy food and regular exercises pre/post health belief model application (N=160)

Practice items	Pre			Post			Chi-square
	Always	Sometimes	Rarely	Always	Sometimes	Rarely	
	%	%	%	%	%	%	
Healthy food practice	35.0	17.0	48.0	89.0	18.1	0.0	96.003
regular exercises	0.0	10.0	90.0	96.0	4.0	0.0	94.759

\*P value :&lt; 0.001

Significance: HS

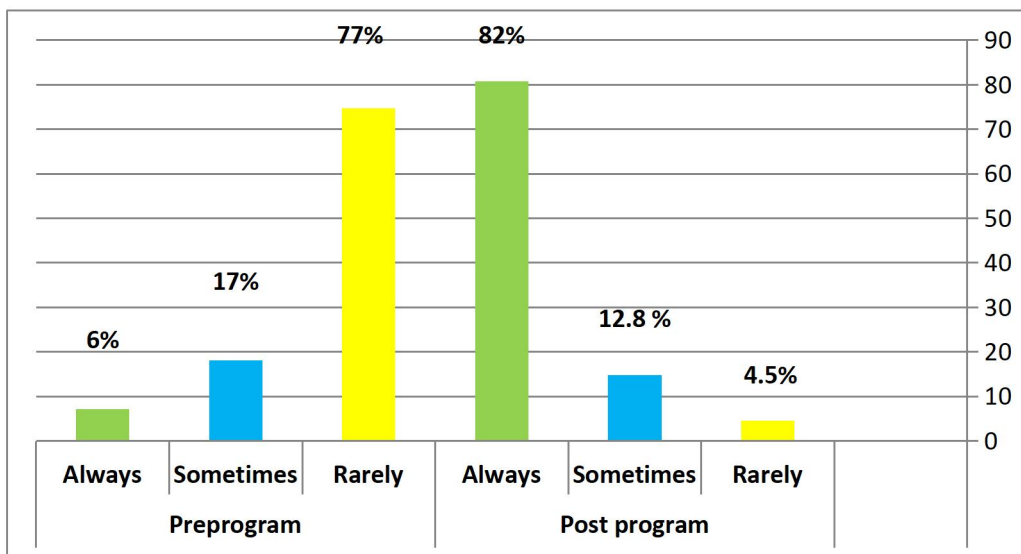


Figure (3): Percentage distribution of undergraduate nursing students regarding their total practices pre/post educational interventions

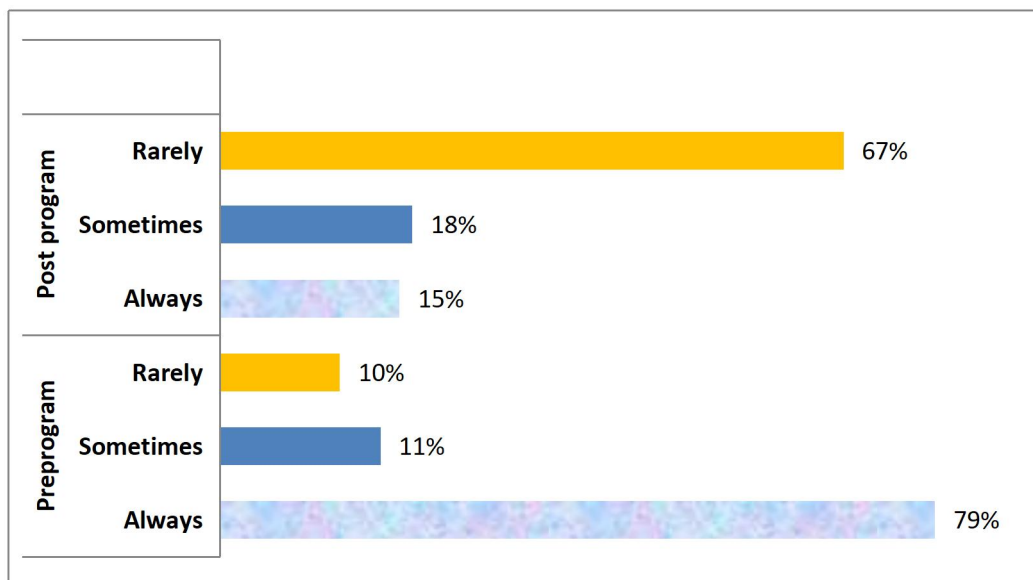
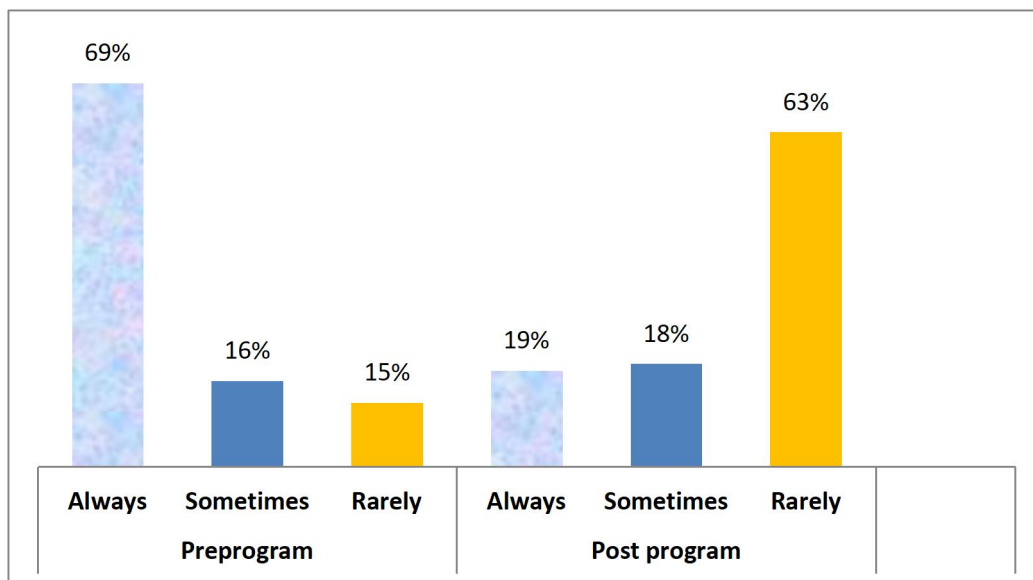


Figure (4): Percentage distribution of undergraduate nursing students regarding their total effect of obesity on their physical health pre/post educational interventions



**Figure (5):** Percentage distribution of undergraduate nursing students regarding their total effect of obesity on their social distress pre/post educational interventions

**Table (4):** Mean score level of undergraduate nursing students according to their Health Belief Model (N=160)

Health Belief Model	All	Obese class I	Obese class II	Obese class III	F – value
the perceived threat of obesity	2.53 ± 0.42	2.43 ± 0.44	2.57 ± 0.37	2.62 ± 0.37	5.91**
perceived benefits of weight reduction	2.97 ± 0.45	2.92 ± 0.38	3.03 ± 0.46	2.94 ± 0.52	2.46
perceived barriers to weight reduction	2.34 ± 0.41*	2.28 ± 0.42	2.38 ± 0.39	2.37 ± 0.46	1.98
cues to action for weight reduction	2.76 ± 0.43	2.57 ± 0.63	2.86 ± 0.43	2.86 ± 0.53	9.45*
perceived self-efficacy in dietary life for weight reduction	2.92 ± 0.45	2.93 ± 0.53	2.92 ± 0.45	2.82 ± 0.37	0.93*
perceived self-efficacy in exercise for weight reduction	2.82 ± 0.47	2.88 ± 0.53	2.78 ± 0.46	2.76 ± 0.43	1.53*
Perceived self-efficacy in - behavioral intention for weight reduction	3.14 ± 0.84	2.65 ± 0.84	3.29 ± 0.73	3.58 ± 0.75	26.37*

SD at \*P < 0.05, \*\*P < 0.01, and \*\*\*P < 0.001

**Table (5):** Multiple regressions on behavior intention of weight reduction (N=160)

Variables	All		Obese class I		Obese class II		Obese class III	
<b>Dependent variable: Behavior intention of weight reduction</b>								
<b>Independent variables</b>	<b>(R2 = 0.156)</b>		<b>(R2 = 0.182)</b>		<b>(R2 = 0.121)</b>		<b>(R2 = 0.249)</b>	
	B	F	B	F	β	F	B	F
Perceived threat	0.16	2.86*	0.25	2.48*	0.03	0.33	0.04	0.14
Perceived benefits	0.14	0.86	0.08	0.69	0.13	1.82	-0.14	-0.83
Perceived barriers	0.03	0.42	0.03	0.12	0.07	0.96	0.05	0.32
Cues to action	0.34	3.96***	0.18	1.29	0.24	1.96	0.68	2.76*
Perceived self-efficacy	0.08*	2.87**	0.12	2.76**	0.07	1.83	0.12	0.92

SD at \*P < 0.05, \*\*P < 0.01 and \*\*\*P < 0.001

**Table (6):** Mean differences of correct knowledge and practices among undergraduate nursing student knowledge pre/post application of the health belief model (N=160)

Undergraduate nursing student's knowledge		Practices				P-value
		Mean	±	SD	t	
General undergraduate nursing student knowledge related to obesity	Pre	6.803	±	8.562	22.326	<0.001*
	Post	*33.045	±	7.862	-9.522	<0.001*
Knowledge about Nutritional habits	Pre	2.873	±	3.456	17.734	<0.001*
	Post	*15.145	±	5.514	12.136	<0.001*
Total undergraduate nursing student's Knowledge	Pre	14.112	±	18.032	23.172	<0.001*
	Post	92.622	±	24.778	14.517	<0.001*

HS \*P &lt; 0.001

**Table (7):** Correlation between undergraduate nursing student's practices and selected health belief model

Health Believe Model	Student practices	
	R	P-value
Perceived threat	0.873	<0.001*
Perceived benefits	0.724	<0.001*
Perceived barriers	0.756	<0.001*
Cues to action	0.328	<0.001*
Perceived self-efficacy	0.349	<0.001*

HS \*P &lt; 0.001

**Discussion:**

According to the WHO, there were around 2.3 billion overweight people aged 17 and up in 2019, with over 700 million obese people (WHO,2021). Hence, the study aimed to determine the effect of educational intervention based on the health belief model among high-risk undergraduate nursing students for obesity.

According to the socio-demographic characteristics of the undergraduate nursing students, the current study revealed that approximately two-thirds of the students' ages ranged from 22 to 23 years old, and more than two-thirds were female. This finding is consistent with the findings of **Al-Rifai and Roudi (2019)**, who conducted a study on "Prevalence and correlates of obesity and central obesity among Omani adults," and found that the age group 18-40 had the highest obesity prevalence, with overweight and obesity increases with age.

Regarding body mass index, the current study found that fewer than half of undergraduate nursing students were obese in class I, one-third were obese in class II, more than ten percent were obese in class III, and just one-tenth were overweight.

This finding is consistent with the findings of studies from Kuwait and Saudi Arabia, which indicated a range of adolescents overweight/obese

between 35-45%. **Al-Isa, (2019)** studied "Body mass index, overweight, and obesity among Kuwaiti intermediate school adolescents" and reported that the overweight/obesity was about one fifth among boys and more than one fifth among girls.

This tendency contradicted findings in a study on the effects of television on metabolic rate, and the potential implications for adult obesity by **Klesages et al., (2020)**, who stated that the prevalence of overweight/obesity was more than ten percent among boys and less than one fifth among girls in teens in the United States.

Furthermore, **Al Rukban (2013)**, who researched "Obesity among Saudi male adolescents in Riyadh, Saudi Arabia," found that "self-reported data underestimate overweight prevalence, particularly among girls and overweight adolescents."

Concerning students' knowledge related to obesity and nutritional habits, the current study represented that the total correct knowledge of students related to obesity, there were three pre-educational interventions based on HBM while changed to the majority of them their knowledge improved post-application of HBM with highly significant differences pre/post educational interventions based on HBM with high significance. From the researchers' point of view, it reflected the critical need for educational

interventions implementation based on HBM to support nursing students.

This finding disagrees with the results of the study about the obese student attending weight-management clinics in the United Kingdom by **Swift et al., (2018)** who conducted a study about " Obesity-Related Knowledge and Beliefs in Obese Adults Attending a Specialist Weight-Management Service " and found that the obese adolescence had poor knowledge about the health risks of obesity. Also, this finding contradicted the results of the study about weight reduction practices and their effects on the nutritional status of Saudi females attending weight reduction clinics in Riyadh City by **Suliman, (2018)** who studied " Weight Reduction Practices and its Effects on the Nutritional Status of Saudi Females Attending Weight Reduction Clinics " and reported that in his study, the university college obesity reported that 9.9% of them had good knowledge, while 56.1% and 34% had fair and poor knowledge levels at pretest period. At posttest still, those who had a good level of knowledge represented the least proportion 10.8% and this may be referred to as most of the sample was studying at university. This may be due to the loss of health education program conducted by health care providers to prevent obesity among undergraduate nursing students.

Regarding the total correct knowledge of undergraduate nursing students related to obesity, the current study revealed that the total knowledge post educational interventions implementation had improved with high significance. From the researchers' point of view, it reflected the positive effect of educational interventions based on HBM.

The current study revealed that there was a highly significant difference between undergraduate nursing students' practices pre and post-application of the educational interventions. From the researchers' point of view, it reflected the successful educational interventions based on HBM.

Regarding practices of undergraduate nursing students, it was noticed that the majority of them always had the total physical effect of obesity on their physical health pre-educational interventions while changed to less than twenty percent post educational interventions with a highly significant

difference between student's practices pre and post application of HBM.

This finding goes with the results of the study about obesity among people in the USA by **Kathryn et., (2019)** who studied "The Contributions of Weight Loss and Increased Physical Fitness to Improvements in Health-Related Quality of Life " and 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.

The current study revealed that there was a highly significant difference between pre & post-application of HBM regarding the total effect of obesity on undergraduate nursing students' social distress. The findings disagree with the results of the study about obesity among Portugal students by **Vieira et al., (2014)** who studied " Usefulness of Standard BMI Cut-Offs for Quality of Life and Psychological Well-Being in Women" and found that all variables, were different 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.

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 undergraduate nursing students.

Concerning the students' perceived self-efficacy in dietary life and exercise the current study weren't shows significant differences among students. This result is consistent with the results of other studies about dietary attitude, dietary self-efficacy, and nutrient intake among students with different obesity indices in Korea by **Lee & Ha (2019)** 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 **Kim et al., (2017)** who shows that when the obesity rate was high, self-efficacy was low.

Regarding the perceived threat, cues to action, and perceived self-efficacy were the significant

variable to predict the 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 the social environment such as family, friends, mass media, and boyfriends. Again, the social environment could be an important factor affecting an 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 disagrees with other studies were done by **Kang et al., (2020)** in a study about factors influencing weight control intention of obese adolescents in Korea showing that the perceived benefit was the most important variable. This might be due to other variables affecting students' behavior toward weight reduction. Also disagree with other studies done on body image and influences on the intention to reduce food intake of female students by **Park, (2019)**, also another result done by **Ryu, (2020)** 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 **Pesa,(2019)** 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.

The findings of the present study point to a positive correlation between undergraduate nursing students' practices and improving their selected health belief model post application of the educational interventions. From the researchers' point of view, the findings reflected acceptance of the set research hypothesis, indicating the effectiveness of the health belief model which led to improved practices and behaviors.

### **Conclusion:**

Based upon the results of the current study and the study aim and hypothesis it was concluded that educational intervention based on the health belief model has a positive effect on improved knowledge and practices among high-risk undergraduate nursing students for obesity. A highly significant improvement in undergraduate

nursing students' correct knowledge regarding obesity, nutritional habits, and their practices post application of the health belief model with highly statistically differences between pre/post educational interventions was found.

### **Recommendations:**

**From the previous findings, the following recommendations are suggested:**

- The educational intervention based on the health belief model should be integrated into care among high-risk undergraduate nursing students for obesity.
- Conducting routine screening by measuring body mass index for undergraduate nursing students who are at high-risk for obesity
- Further research about the impact of obesity on self-efficacy after training programs.

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