

Effect of Educational Booklet Based on Health Belief Model on Male Nursing Students' Knowledge, Practice and Beliefs Regarding Testicular Self-Examination

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Abstract:

Background: Testicular cancer (TC) is the most common malignancy in young men between the ages of 15 and 35 years. It is easily treated if detected early through regular testicular self-examination (TSE). Raising students' awareness of testicular cancer and TSE is very important for early diagnosis and improving their health belief. **Aim of the study:** To evaluate the effect of educational booklet based on health belief model male nursing Students' knowledge, practice and beliefs regarding testicular self-examination. **Methods:** A quasi experimental design was used. A convenient sample of 112 male nursing students from Faculty of Nursing South Valley University. **Tools:** Three tools were used. **I:** A self-administered questionnaire that assessed demographics and testicular cancer knowledge. **II:** Testicular self-examination checklist to assess the nursing students' practice regarding TSE **III:** Champion's Health Belief Model Scale to assess the nursing students' beliefs and self-efficacy regarding TC and TSE. **Results:** There was a highly statistically significant improvement among male nursing students in their level of knowledge, practice and Health Belief Model about TSE at immediate post, and post 3 months after implementation of the educational booklet with $p < 0.05$. Also, there was a positive correlation between level of knowledge and practice with Health Belief Model in pre, post one month and post three months at p -value < 0.01 . **Conclusion:** The use of an educational booklet based on the health belief model has a beneficial effect on nursing students' knowledge and practice and health belief regarding TC and TSE. **Recommendation:** Regular TSE is essential for the detecting TC early. There for, it is crucial to conduct extensive teaching campaigns and training on TC and TSE techniques among younger male.

Keywords: educational booklet, health belief model & testicular self-examination

Introduction:

The testicles are the internal sexual organs that produce sperm, which is the male reproductive cell (Dogan et al., 2016). Testicular cancer (TC) is a malignant tumor of the male reproductive system. A germ cell tumor arises in the cell that produces sperm and is the most common form of TC by 95%. Testicular cancer is one of the most important hazards facing young men aged 15 to 35 in both developing and developed nations. However, the prevalence of TC is rising globally. According to new data, one in every 250 men will be diagnosed with TC, and one in every

5,000 men will die from it (Hanna and Einhorn., 2014; Albers et al., 2015; Stonier and Coscione., 2021).

The primary reasons of TC are tending to be unclear, and in about 80-90% of cases the cause is not identified. However, data shows that several risk factors, including as cryptorchidism (undescended testicles), family history, and genetic variables, might increase the likelihood of getting TC (Akers., 2018; Singh et al., 2020; Stonier and Coscione., 2021)

Symptoms of testicular cancer may include a nodular or painless inflammation in one of the testicles which the patient or his sexual partner can detect. An individual with testicular hypoplasia or enlargement may occasionally become infected with testicular cancer (Ugurlu et al., 2017). Swelling, pressure in the lower abdomen, perineum, or scrotal area, back pain, unclear discomfort, or sudden collection of fluid in the scrotum are reported by 30% to 40% of individuals. Also 10% of individuals experience severe testicular cancer symptoms, and the clinical symptoms change based on the disease stage and the affected areas (Robert and George., 2019).

Testicular self-examination is now the most successful behavioral and early detection methods for discovering testicular abnormalities in the initial stages of testicular cancer. According to the National Cancer Institute reported that, the almost all of testicular tumor are discovered in men, generally with TSE. It functioned exactly as intended, and was found decrease the number of TC deaths on a monthly basis. (Alemu and Baih, 2019). A regular TSE, can assist discover a suspected problem in the testicles prior a more intensive medical examination to diagnosed TC. TSE is a periodic examination that the subject performs once a month in front of a mirror during or after a shower through inspection and palpation approaches. The TSE is performed with the two hands; one of them stabilizing the testicle and the other hand examining it for masses. (Gumus and Terzi., 2018).

Early-stage of TC is more tend to be cured, and may decrease the TC associate morbidity and mortality. Early detection of TC can be accomplished (TSE), which is an easy and successful method for first diagnosis in the majority of men (Akers., 2018). In spite of the value of expanding the possibility of early recognition and diagnosis of TC, a number of studies have found that men usually have insufficient knowledge, poor TSE skills, misconception and beliefs concerning the features and threats of TC, and a beneficial effect of performing TSE (Stonier and Coscione., 2021; Bresciani et al., 2021). Therefore, the observed effect of early diagnosis on the TC outcomes, it is imperative

to raise awareness of the role of TSE and improve men's knowledge and practice for carrying out TSE.

Nurses, play critical roles in encouraging self-examination, and offering counselling and support for TC patients. In addition, nurses can deal with patients' fears and misunderstand about TC and TSE, so this is important in motivating males to pursue health care guidance as needed (Asgar et al., 2018).

Nursing students are a valuable target group for studying because they will be the future care giver tasked with teaching patients' self-examination procedure and supporting preventive health behaviors (El Mezayen and Abd El-Hay., 2019; Ustundag., 2019). On other hand, nursing education plays a vital role in training nurses to give holistic care for patients with TC. It involves improving their communication and counselling abilities, as well as assuring adequate knowledge and awareness of TC and TSE (Ahmed et al., 2019; Akca et al., 2021).

The Health Belief Model (HBM) is a commonly used theoretical framework in health behavior studies that describes and explains the health behaviors of individuals. According to the HBM, individuals are more likely to engage in particular health-related behaviors (such as TSE) when they suspect they are at risk of disease, believe that their behavior reduce risk, and when they believe the rewards of that behavior meet the costs, barriers and embarrassment. In the framework of TC, the findings revealed that the HBM provide a successful method for thoughtful TC awareness and behaviors in young males (Ustundag., 2019; El Mezayen and Abd El-Hay., 2019; Khani et al., 2021).

Significant of the study:

The relative incidence rate of testicular cancer in Egypt is 0.5 per 100,000 in Lower Egypt, 0.5 per 100,000 in middle Egypt, and 0.4 per100,000 in Upper Egypt (Ibrahim et al., 2014). The incidence of TC has increased in recent decades. Few researches have investigated the utilization of the HBM to

increase TC knowledge and behaviors among Egyptian nurses' student. They are a significant group to study, as they are going to be future healthcare professionals who can teach patients about cancer prevention and detection (Akca et al., 2021). Furthermore, TC remains a low public health concern in Egypt; there may be related cultural aspects that affect TC insight, behaviors and beliefs of nursing students.

Aim of the study

To evaluate the effect of educational booklet based on health belief model on male nursing Students' knowledge, practice and beliefs regarding testicular self-examination

Operational Definition:

Health belief model is a combination of student knowledge, practices, beliefs and actions used for evaluate a preventable health behavior as a preventive nursing practice. (Khani et al., 2021).

Research hypothesis:

- H1: Male nursing students who receive an HBM-based educational booklet will exhibit higher knowledge scores after intervention than before.
- H2: Male nursing students who receive an HBM-based educational booklet will exhibit higher practice scores after intervention than before.
- H3: Male nursing students who receive an HBM-based educational booklet will exhibit positive belief scores after intervention than before

Subjects and method

Research Design:

A quasi-experimental design (one group pre- post-test) was used in this study.

Setting

The study was carried out at the Faculty of Nursing, South Valley University, a public area in Upper Egypt.

Sampling and sample size:

A convenient sample of 112 male nursing students at various academic levels of the nursing program who were agree to engage in the study, and whose ages ranged from 17-24 years. Exclusion criteria included: male nursing students who were unwilling to take part in the study.

Sample size:

Based on data from the literature, the sample size calculated via the following formula (Metwally et al. 2019).

$$n = \frac{[DEFF * Np(1-p)]}{[(d^2/Z^2(1-\alpha/2)^2 * (N-1) + p*(1-p)]}$$

DEFF (Design effect) = 1

N (population) = 578

p (Hypothesized %) = 10% +/-5

d (tolerated margin of error) = 0.05

Z (level of confidence) = 1.96

α (Alpha) = 0.05

$$n = \frac{[1 * 578 * 10\% +/- 5 (1 - 10\% +/- 5) / [(0.05)^2 / (1.96)^2 - 0.05 * (578 - 1) + 10\% +/- 5 (1 - 10\% +/- 5)]}{1} = 112 \text{ students.}$$

Tools of data collections: The following data collection tools were used.

Tool I: A self-administered structured questionnaire: It was designed by the researchers after reviewing the relevant literature (Abd Algany et al. (2015); Metwally et al. (2019)). It includes two parts:

Part one: Focused on the demographic data of the students, including their age, academic year, place of residence, religion, and family history of testicular cancer.

Part Two: Student knowledge regarding testicular cancer. It consisted twenty-five questions which assessed students' knowledge of testicular cancer on three basic themes: the first was the knowledge of testicular cancer (9 questions), the second was the knowledge of risk factors for testicular cancer (4 questions), and the third was the knowledge of testicular

self-examination (12 questions), with true, false, and don't know options for each question. Students' responses to their knowledge were scored and computed. Each correct response gives one grade, while incorrect or "don't know" responses give zero. As a result, students' responses were categorized as either satisfactory (60% or above) or unsatisfactory (less than 60%).

Tool (II): Testicular Self Examination Checklist: It was adopted from (Wilson, et al., 2018). It was used to assess students' practice regarding testicular self-examination, which comprised (13) steps; each step gives score one for done and zero for not done. The total score for practice is 13 points that categorized as incompetent practice (less than 75%) and competent practice (75% and more).

Tool III: Champion's Health Belief Model Scale (CHBMS) (pre/post-educational booklet): It was developed by (Avcı & Altinel, 2018) and adopted to assess male nursing student ' health beliefs. Its thirty-seven items self-reported questionnaire on a five-point Likert scale. The scale ranged from 1 (strongly disagree) to 5 (strongly agree). The health belief model scale is divided into six subscales: five items for perceived susceptibility, ten for perceived seriousness, six for benefit, three for motivation, nine for barriers, and four for self-efficacy. The scale had no overall score. The score for each subscale was computed separately. High rating on the barriers subscale represented a negative status, while high rating for susceptibility, seriousness, self-efficacy, benefits, and health motivation represented a positive status

Validity and reliability of the study tools:

The current study's tools I, II, and III were sent to five academic nursing staff in the Medical and Surgical Nursing field to be test the validity of the content. All proposed adjustments were made for the understanding of the sentences and the appropriateness of the content. Bilingual Arabic experts translated the tools into Arabic and then back-translated them into English. The reliability test was performed

using Cronbach's alpha to determine the relevance of the questionnaires. The reliability test for the second part of the first tool, which covered the students' knowledge of TC and TSE, was 0.82, the reliability test for the second tool was 0.90, and the reliability test for the third tool (HBM) was 0.87.

Ethical consideration

The Research Ethics Committee, Faculty of Nursing, South Valley University, Qena, Egypt, approved the protocol for this research project (SVU-NUR-MEDSUR-1-18-7-2022). Approval was obtained from the Dean of the Faculty of Nursing, South Valley University. To safeguard the participant's rights, all students were informed of the study's purpose and their research ethical rights, and were free to decide whether they wanted to participate or not.

Written informed consent was then obtained from each student. Data collecting, confidentiality and privacy were considered. Instead of the name, a code number was used.

A pilot study:

To test the study tools for, feasibility, clarity, applicability, and the time needed to complete the study tools, a pilot study was conducted on 10% (12) of the students. According to the findings of the pilot study, the necessary changes were made by eliminating unnecessary or repetitive questions and making improvements prior to data collection. The pilot study participants were not included in the main study sample.

Field work:

The data were gathered over seven-months, from the beginning of October 2022, until the ending of April 2022. In order to achieve the research goal, four phases were carried out, namely the phases of assessment, planning, implementation and evaluation.

Assessment phase:

Prior to the start of the educational sessions, male nursing students were assessed using Tools (I), (II), and (III) to assess nursing

students' knowledge, practice, and health beliefs related to TC and TSE in order to identify the prerequisites for male nursing students and the number of sessions. The students took 40 minutes to fill out all of the questionnaires.

Planning:

Based on the findings of the assessment phase, researchers reviewed the related literature to create educational sessions about TC and TSE based on HBM. Depending on the content, a colorful booklet was developed in plain Arabic language to match the content. The created content was sent to five experts for validation, and they were asked to offer their opinions and comments on the content of the session. The text has been revised according to the recommendations of the experts.

The booklet was contained the following: anatomy of the tests, definition of testicular cancer, prevalence of male testicular cancer, its morbidity and mortality rates, risk factors, signs and symptoms of testicular cancer, the benefit of testicular cancer early detection, self-examination of testicle and how to do it at home. Furthermore, HBM provides information on health motivation, testicular cancer susceptibility, benefits, barriers to undergoing a testicular screening, and self-efficacy.

Implementation phase

Male students were assigned into six small groups, each group containing between 18 and 20 students. All male students were taking part in the theoretical and practical part. Each group received five educational sessions (four theoretical and one practical) (twice per week) for three consecutive weeks, for each group of students. Each session lasted (30 to 40 minutes). At the end of each session, the researchers and their participants arranged to meet up for the next session.

The educational sessions covered the following items:

- The first session provides an introduction about TC and its magnitude in Egypt.

- The second session which illustrates the elements of the first HBM subscale. Includes information about perceived susceptibility to TC, tests health awareness, tests anatomy, epidemiology, risk factors, and symptoms of TC.

- The third session which illustrates the elements of the second HBM subscale. Includes information about the perceived seriousness to TC, which explains the changes occur in overall life as a result of TC or the likelihood of TC such as the worsening of TC in leading to death or orchiectomy, TC metastases, the treatment with chemotherapy or radiotherapy, TC makes males feel uneasy and threatens the relationships with others.

- The fourth session which illustrates the elements of the third and fourth HBM subscale includes information on the benefits of TSE and deal with the clinical examination of the testicles (quality of life, benefit of early diagnosis and treatment, costs). In addition, the session included information about the perception on barrier in which students were advised on how to handle issues such as insufficient knowledge, shame, abandonment, fear, youth, easy forgetfulness, lack of time, and past experiences.

- The fifth session which illustrates the elements of the fifth and sixth HBM subscale, which contain information on health motivation such as: how to identify health problems early and

the desire to stay healthy, discussing responsibility for one's own health. In addition, the session includes information on the confidence/self-efficacy in which TSE were taught. Students received training on how to perform TSE effectively. TSE was demonstrated using a testicular model. Cancer prevention such as eating a balanced diet, obeying medical recommendation which promote health, taking regular efforts to improve health, searching new health information, annual physical examinations, and exercising at least three times a week.

- All participants received an educational booklet at the end of the fifth educational session, the teaching approach were lecture,

small group discussions, brain storming, and open discussions. Data show presentation, flipchart, figures, and audiovisual aids were employed as media.

Evaluation Phase:

Researchers used the same pretesting Tool I (part two), Tool (II) and Tool (III) was used to evaluate students' testicular self-examination immediately post implementation of the education booklet, and three months later.

Statistical-Analysis

Researchers coded and analyzed the collected data using tables and figures. For qualitative variables, data were analyzed using numbers and percentages. For quantitative variables, the mean and standard deviation are used. Correlation is used to determine the relationship between quantitative variables. A paired t-test was used to compare the means of the quantitative variables before and after the intervention. The Chi-square (X^2) test was also used. The statistical significance of the results was determined as ≤ 0.05 significant

Results:

Table 1: Shows that average means age between students was (20.68 ± 1.0) respectively with (27.2%) of them in their fourth year of study and most of the students (87.5%) were Muslim. Moreover (62.5%) of all were from rural areas. they were mostly (82.14%) had no family history for testicular problems, also more than half (64.3%) had no any information about testicular self-examination before, but (22.3%) had information from mass media and internet. Not all students have participated in any training program on testicular self-examination

Table 2: Shows that a highly statistically significant difference in all mean knowledge

elements as testicular cancer, testicular cancer risk factors, and testicular self-examination between pre, immediate post and post 3 months of implementation the educational booklet as well as total knowledge mean score with statistically significant difference at $p = (<0.001)$.

Table 3: Shows that the studied students (84.8 %) had unsatisfied knowledge pre-implementation of educational booklet compared to (99.1% and 97.3% respectively) at immediate post, and 3months post implementation of educational booklet with statistically significant difference at $p = (< 0.001)$

Table 4: Shows that there has been a statistically significant improvement in TSE practice, immediate post and post 3 month from implementing of the educational booklet than pre-implementing of the educational booklet at $p = < 0.001$.

Table 5: Reveals that the total mean score of health belief among students at pre, immediate post and post 3-months was significant difference regarding; susceptibility, seriousness, benefits, health motivation, barriers and self-efficacy at $p = (<0.001)$

Table 6: shows that there was statistical significant positive correlation between level of knowledge and practice with Health Belief Model as regard benefits, health motivation, self-efficacy in pre, immediate post and post 3 months at p -value $< .01$ also statistical significant positive correlation was found between level of knowledge and practice with Health Belief Model Scale as regard susceptibility, benefits, seriousness, health motivation, self-efficacy at immediate post and post 3-month only at p -value $< .01$.

Table (1): distribution of the student sample according demographic characteristic data (n= 112).

Sociodemographic characteristics	No	%
1- Age:		
< 20 years	43	38.4
> 20 years	69	61.6
Age range	19-23 years	
Mean ± SD	20.68±1.03	
2- Academic levels		
First	23	20.5
Second	28	25.0
Third	30	26.7
Fourth	31	27.6
3- Residence:		
Urban	42	37.5
Rural	70	62.5
4- Religion		
Muslim	98	87.5
Christian	14	
5- Family history of testicular problems		
Yes	20	17.86
No	92	82.14
6- Information about testicular self -examination		
Yes	40	35.7
No	72	64.3
7- Source of information		
Mass media &Internet	25	22.3
Health team	8	7.1
Friends and relatives	7	6.3
None	72	64.3
8- Previous training:		
Yes	0	0.0
No	112	100.0

Table (2): Mean Scores, Standard Deviation and Significant Differences of Knowledge Score Among Students' Sample at Pre, Immediate Post and Post 3 Months of Implementation of Educational Booklet (N = 112)

Knowledge	Pre	Immediate Post	Post 3 months	Paired sample t test	
	Mean ±SD	Mean ±SD	Mean ±SD	Pre / immediate t & (p value)	Pre / post 3months t & (p value)
Knowledge about:					
1- Testicular Cancer	3.17±1.81	6.91±1.28	6.68±1.43	21.58 (<0.001*)	20.45 (<0.001*)
2- Risk Factors for Testicular Cancer	2.20±1.34	3.54±0.59	3.50±0.60	10.85(<0.001*)	10.54 (<0.001*)
3- Testicular Self-Examination	4.89±2.14	8.20±1.51	7.79±1.69	16.85(<0.001*)	14.52 (<0.001*)
Total knowledge: Mean ±SD	10.27±4.27	18.66±1.71	17.78±2.22	23.61 (<0.001*)	21.88 (<0.001*)

t- test & p-value significance (<0.05)

Table (3): Frequency distribution of Knowledge score Levels obtained during Pre, immediate Post and Post 3-Months of implementation of educational booklet (n= 112)

Total knowledge	Pre		Immediate Post		Post 3 months		Pre / immediate χ^2 & (p value)	Pre/ Post 3 months χ^2 & (p value)
	No	%	No	%	No	%		
	- Unsatisfied knowledge (< 60%)	95	84.8	1	0.9	3		
- Satisfied knowledge (\geq 60%)	17	15.2	111	99.1	109	97.3		

χ^2 : Chi square test * significant P value \leq 0.05

Table (4): Frequency distribution of Levels of testicular salve examination Practice among students at Pre, immediate Post and Post 3-Months of implementation of educational booklet (n= 112)

Total practice	Pre		Immediate Post		Post 3 months		Pre / Immediate χ^2 & (p value)	Pre/ Post 3 months χ^2 & (p value)
	No	%	No	%	No	%		
	Incompetent (< 75%)	109	97.3	5	4.5	8		
Competent (\geq 75%)	3	2.7	107	95.5	104	92.9		

χ^2 : Chi square test * significant P value \leq 0.05

Table (5): Mean Scores, Standard Deviation and Significant Differences of The Health Belief Scale (HBS) Among Students Sample at Pre, Immediate Post and Post 3 Months of Implementation of Educational Booklet (N= 112)

Health Belief Scale	Time			Pre / Immediate t & (p value)	Pre/Post 3 months t & (p value)
	Pre	Immediate Post	Post 3 months		
	Mean \pm SD	Mean \pm SD	Mean \pm SD		
- Susceptibility	9.09 \pm 4.98	19.73 \pm 3.27	22.26 \pm 1.99	18.30 (<0.001*)	25.37 (<0.001*)
- Seriousness	12.00 \pm 6.46	30.44 \pm 9.36	32.43 \pm 6.50	17.24 (<0.001*)	22.81 (<0.001*)
- Benefits	16.11 \pm 8.27	25.07 \pm 3.84	26.26 \pm 2.99	10.37 (<0.001*)	11.99 (<0.001*)
- Health Motivation	6.68 \pm 3.17	10.45 \pm 1.80	12.19 \pm 1.21	10.79 (<0.001*)	17.41 (<0.001*)
- Barriers	33.19 \pm 7.02	20.08 \pm 2.81	11.80 \pm 1.52	17.19 (<0.001*)	31.40 (<0.001*)
- Self-Efficacy	7.21 \pm 3.25	14.04 \pm 2.23	16.52 \pm 1.51	17.73 (<0.001*)	27.08 (<0.001*)

t- test & p-value significance (<0.05)

Table 6: Correlation Coefficient Between Testicular Self Examination's Knowledge And Practice Verses Health Blelief Model Scale At Pre, Immediate Post And Post 3 Months of Implementation of Educational Booklet (N= 112)

Health Belief Model Scale	Spearman's rank correlation coefficient (r)					
	Pre		Immediate Post		Post 3 months	
	Knowledge	Practice	Knowledge	Practice	Knowledge	Practice
- Susceptibility	.117	.149	.255 **	.195 *	.222 *	.214*
- Seriousness	.127	.198*	.199*	.268**	.228*	0.220*
- Benefits	.417 **	.448 **	.205*	.189*	.203*	.185*
- Health motivation	.250**	.401**	.355**	.239*	.202*	.214*
- Barriers	-.106	-.063	-.212**	-.126	-.186*	-.154
- Self-efficacy	.351**	.356**	.404**	.218**	.229*	.242*

(r) Correlation is significant at < 0.01

Discussion

Testicular Cancer is a unique type of tumor that mostly affects young men between the age 15 to 40 years and it is one of the most common incurable tumors when recognized early and managed with a multimodal method. Early recognition of TC through TSE is very significant for effective dealing and recovery. The involvement of nursing members in raising knowledge of TC and the crucial role of TSE is essential for enhancing early recognition and prognosis for those diagnosed with the condition (**Park et al., (2018)**).

Unfortunately, the research indicates that young males and adolescents in Arab nations has deficiency of knowledge and unfamiliar of the clinical features, symptoms, diagnostic test, risk factors, and management of TC as well as how to do TSE. Research also highlighted on wrong perception and beliefs about the threats of TC and an underestimated the advantages of performing TSE as a key technique for early recognition of TC. These wrong perceptions and beliefs may influence their behaviors if TSE is not performed regularly (**Salati et al., 2020; Alaradi and Almuqamam, 2020; Alamri et al., 2021**).

In terms of socio-demographic characteristics of the participants' students, the study found that more than half of the students were younger than 20 years old, despite the fact that the subjects were drawn from all academic years. The vast majority of participants didn't have family history of testicular problems and had not enrolled in any testicular cancer educational program or self-examination.

This finding is consistent with **Ramim et al., (2014)** who reported that in a study of testicular cancer among students at a medical sciences university, and found that the students' ages varied from 17 to 41 years, with roughly two-thirds of them in their first and second years. In the same line **Pour et al., (2018)** who examined "the effects of testicular self-examination education on knowledge, performance and health beliefs on Turkish men" and revealed that the mean age of the students

was 20.60 ± 1.89 , This result is consistent with previous studies that examined the same aspects in medical students from different countries and concluded that TC is the most frequent form of malignance in European adolescents and young men, and its incidence is raising in developed nations, although require for early recognition of TC. Furthermore, this result is also compatible with **Metwally et al., (2019)**, who reviewed an "evidence-based practical guideline for promoting testicular cancer preventive behavior among nursing males' students." The study found that the majority participants did not have a family history of testicular cancer, whereas a tiny percentage did.

Regarding knowledge mean score the result of this study exploring improvement of all knowledge elements mean score as testicular cancer, risk factors, and testicular self-examination at immediate post, and post 3 months after intervention when compare to pre-intervention with statistically significant difference between them. This lack of knowledge was due to the fact that undergraduate nursing curricula, which lacked theoretical content of interest in this cancer type, and it was suggested that student respondents were pad before receiving educational booklet with changed after it. This reflects the critical need to be aware the risks they can pose.

The current findings are consistent with those of **Ingwu et al., (2016)** who investigated "awareness and practice of testicular self-examination among male medical students at the Nigerian University's Enugu campus in south-eastern Nigeria." The study found that following the educational intervention, the majority of respondents had a strong understanding of testicular cancer and self-examination. Additionally, **Pour et al., (2018)** who discovered that TSE training is useful in young males but should be performed on a regular basis for optimum efficiency. Furthermore, this finding is congruent with the findings of **Saab et al., (2016)**, who study that "testicular cancer awareness and screening practices: A systematic review" and who discovered that more than two-thirds of the participating nurses lacked awareness regarding TC and TSE prior to program implementation.

This level of knowledge has improved significantly for most of them after program completed and was retained in the post-evaluation. This finding might be explained the general public's lack of knowledge about TC and TSE **Saab et al., (2016)**, who highlighted that, a knowledge gap about TC and its detection in young adult males, and highlighting the fact that the intervention group that received the training noticed a significant improve in their awareness of self-examination. **Pour et al., (2018)** who revealed that, knowledge about TSE and TC was poor, only ten percent of the students knew that a lump in the testicle could be a sign of TC and this knowledge improved following educational program. Moreover, **Gutema et al., (2018)** who studied that "testicular self-examination among Bahir Dar University students: application of integrated behavioral model "and who reported that, young men have a low level of TC knowledge. Despite the fact that three quarter of male answered that they knew TC, more than half % of men choose the lump or enlarged testicles as the most common symptom and only fifteen percent of men knew the most common age at diagnosis. Besides to **Khani et al., (2015)** in the study done about "the effect of a prevention program based on health belief model on osteoporosis" and who noted that, more than half of the students did not know any information about TSE and this affected on performance of TSE before TC program application.

In terms of testicular self-examination practice, the present study showed a statistically significant improvement in practicing TSE at immediate post and three months after the implementation of the educational booklet at $p < 0.001$. Also, one of the most crucial components of self-care for health promotion is self-examination, which raises man's understanding of the value of screening procedures and the advantages of early disease identification and appropriate treatment, less complication, and better health status (**Metwally et al., 2019**).

This result in the same line with **Pour et al., (2018)** reported that TSE education is beneficial in young men but must be performed periodically for more effective results.

However, the present results contrast with **Zeleke et al., (2019)**, who investigated the "knowledge, attitude and practice towards testicular self-examination among regular undergraduate non-health sciences university students, Debre Tabor, Amhara Regional State, North West Ethiopia " and who indicated that most participants reported a lack of ability for performing TSE, viewed TSE a consuming time task and embarrassing practice.

According to the current study, there was a significant difference in total mean score of health belief items among students at pre, immediate post and post three months with a significant difference in; susceptibility, benefits, seriousness, barriers health motivation, and self-efficacy at $p = (<0.001)$. These results can be explained by students' misconception that this type of cancer only affects older age groups as a result of physiological changes, which results in a decrease in motivation to learn about testicular cancer prevention strategies like TSE. However, positive behavioral changes were observed when educational guidelines were followed, indicating that students' knowledge and enthusiasm regarding this type of cancer have significantly increased. These results corroborated those of **Pour et al., (2018)** who found a considerable rise in the perceived benefits of TSE. Additionally, there was a noticeable improvement in students' TSE conduct following the educational instructions.

In addition, this is consistent with **khani et al., (2021)** who studied that " effect of educational intervention based on health belief model and social support on testicular self-examination in sample of Iranian men " and who showed that there was an improvement in the mean perceived benefits and a decline in the mean score for perceived barrier in the study group at three and six months following the educational intervention, compared to control. The educational guideline has a significantly impact on the removing of barriers to practice TSE. In a study by **Brewer and Watters., (2017)**, who studied that "testicular self-examination in an adult community sample "and who discovered that individuals' intentions to do TSE were predicted by their perceptions of the rewards and risks associated with doing so. Also, with **Akar and Bebiş., (2014)**, who

studied that "Evaluation of the effectiveness of testicular cancer and testicular self-examination training for patient care personnel: intervention study "and who found, that educational intervention caused in decrease perceived barriers of participant. In other similar studies, the educational intervention caused in raised perceived benefits and the decreased of perceived barriers (Jeihooni et al., 2019; Kouhpayeh et al., 2017)

The study found a statistically significant positive correlation between level of knowledge and practice with the Health Belief Model in terms of benefits, health motivation, and self-efficacy in pre, immediately, and post three months at p-value. <.01. Also, statistically significant positive correlation was found between level of knowledge and practice with Health Belief Model Scale as regard susceptibility, benefits, seriousness, health motivation, self-efficacy at immediate post and post 3 month.

This study is in line with Alemu and Baih., (2019), who studied that "knowledge, Attitudes and Practice toward Testicular Cancer and Testicular Self-Examination among adolescents and young adults in Aseer region, Saudi Arabia".and who revealed that a significant association between self-efficacy and TSE performing status also found that a significant association between TSE and barriers, seriousness, and self-efficacy and health motivation. In addition, Avci and Altinel., (2018) who studied that "The validity and reliability of health belief scale for testicular cancer self-examination. "and found that individuals who have knowledge and practice health-protective actions have better self-efficacy ratings than those who do not. The impression of vulnerability and seriousness toward the present circumstance must be high for the behavior modification to be successful.

This was consistent with the findings of McClenahan et al., (2017), who studied that " Testicular self-examination: a test of the health belief model and the theory of planned behavior "and who discovered that a significant association between TC knowledge and TSE practice. As a result, better knowledge accompanied by higher TSE practice, and

conversely. This was most likely caused by the students' lack of confidence and competency in carrying out TSE.

These findings emphasize the importance of raising awareness through nursing education, particularly for issues like testicular cancer prevention and health promotion. The current findings were consistent with the findings of Mohamadloo and Mohamadloo., (2017), who studied that Implementation of the theory of planned behavior to testicular self-examination among young men in Tehran and who stated that the majority of men saw TC education as a positive step towards raising awareness about this cancer and TSE.

Conclusion:

The educational booklet significantly improves students' knowledge and practice and health belief regarding TSE immediately and three months later when compared to pre-intervention. Furthermore, there were statistically significant positive correlations between students' knowledge and practice and their health beliefs.

Recommendation:

Based on the findings of this study, the following recommendations are suggested:

1- Health education provided by healthcare professionals should be organized and implemented at the schools in order to improve the knowledge of a highly selected group, such as nursing students, in terms of TC and TSE.

2. Interventions, such as routine doctor visits and the presence of prevention campaigns, are urgently needed to enhance men's awareness of testicular illnesses and their intentions to seek medical attention for testicular symptoms.

3- More extensive research is needed to examine the factors impacting TSE practice among Egyptian men as well as the best ways to

apply the technique across various societal segments and age groups.

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