

# Effect of Pelvic Floor Muscle Exercise on Stress Urinary Incontinence Among Women on Pelvic Radiation

Hanan Mohamed Younis<sup>1</sup>\* Dalia Salah El-Deen<sup>2</sup>

1.Lecturer, Medical Surgical Nursing department, Faculty of Nursing, Cairo University, Cairo, Egypt

2.Assistant professor, Medical Surgical Nursing department, Faculty of Nursing, Cairo University, Cairo, Egypt

## Abstract

Radiation is cornerstone of the treatment of many pelvic tumors. Radiotherapy cause cellular death that benefits cancer control, but can also result in adverse effects such as urinary incontinence. Urinary incontinence is one of the major problems that has an impact on female's quality of life, as it disturbs about one third of adult women worldwide. Aim: The aim of the study was to examine the effect of pelvic floor muscle exercise on stress urinary incontinence among women on pelvic radiation. Design: A quasi experimental design was utilized for conducting the study. Sample: A sample of 60 adult female participants on pelvic radiation, and had scored more than 10 on the Questionnaire for Urinary Incontinence Diagnosis at Radiology Department in Oncology Unit in one of the biggest teaching hospitals in Cairo, Egypt was recruited, and the sample was randomly divided into study and control groups (30 participants each). Tools: Data were collected using five tools; demographic and medical data sheet, Questionnaire for Urinary Incontinence Diagnosis, The Incontinence Severity Index Scale, Incontinence Impact Questionnaire, and The Incontinence Quiz Scale. Results: There were statistically significant differences regarding quality of symptoms, severity of incontinence, incontinence impact, as well as knowledge regarding stress urinary incontinence in the study group after implementation of the pelvic floor muscle exercise when compared to the control group. Conclusion: the pelvic floor muscle exercise improved the urinary incontinence among participants undergoing pelvic radiation therapy. Recommendation: It is suggested to apply pelvic floor muscle exercise for participants on pelvic radiation therapy in their early course of treatment.

**Keywords:** Pelvic floor muscle exercise, urinary incontinence, stress urinary incontinence, pelvic radiation, women.

## 1. Introduction

Urinary incontinence (UI) is defined as an involuntary leakage of urine that is objectively displayed by physiologic testing (Bilgic et al., 2017). Urinary incontinence in women is a highly common complaint that is tremendously treatable. However, social distresses, shame, and other patient concerns often prevent discussion, and thus treatment of the problem. Urinary incontinence can occur as a result of many medical health problems such as heart failure, cerebrovascular stroke, diabetes mellitus and multiple sclerosis; after trauma or surgery; and as an adverse effect of some medicines, such as loop diuretics (Delarmelindo et al., 2013).

Cancer in the pelvic region that can cause the risk of UI has a high incidence among other types of cancers, as, the cancer incidence in Egypt among females was 3.4% for urological cancers (bladder and ureters), 3.1% for lower gastrointestinal tract (colon, rectum, anus), 8.45% for gynecological cancers (ovary, uterus, cervix, vulva, vagina), with total numbers 14.95% of total cancers that affect females in Egypt (Ibrahim et al., 2014). But, more often, the problem is caused by treatments of cancer, as radiotherapy, rather than the cancer itself. Moreover, surgeries that eradicate tumors near the bladder can cause UI by destructing the muscles and/or nerves that control urination such as surgery for gynecologic cancers (hysterectomy), and colorectal cancers (Favro et al., 2016).

Radiation is cornerstone of the treatment of many pelvic tumors. Pelvic radiotherapy today plays an imperative role in the treatment of such cancers. This management modality has been shown to have early as well as late morbidity (Daniel et al., 2014). Radiotherapy cause cellular death that benefits cancer control, but can also result in adverse effects such as urinary incontinence. Radiation to the pelvic area can destruct bladder muscles and/or nerves, irritate the lining of the bladder and produce scar tissue, all of these can cause UI. Hormone therapies that acts on lowering estrogen can damage the ligaments holding the bladder and cause incontinence (Favro et al., 2016).

The international Continence Society describes urinary incontinence as: the state in which the involuntary loss of urine is a social and obvious problem (Christopher, 2017). Urinary incontinence in females is usually divided into: stress incontinence, overactive bladder, mixed incontinence, overflow incontinence, and urgency incontinence. Stress and urgency incontinence account for ninety percent of all cases of incontinence in females (Lacey, 2012).

Treatment of incontinence initially focuses on lifestyle changes and behavioral interventions. If these are useless, pharmacological treatments can be trialed, relying on the type of incontinence. Surgical options are available for stress urinary incontinence, if conservative treatments are ineffective. Other conservative,

nonsurgical treatments for UI have been developed lately. For example, electronic devices that motivate the pudendal nerve (Lacey, 2012). The prognosis for patients with urinary incontinence depends on the severity of incontinence, the type, the original cause(s), any contributing factors and the patient's motivation for treatment. However, most incontinence can be significantly improved even where it cannot be "cured" (Al-Hasni, 2017).

Pelvic floor muscle exercise (PFME), also known as kegel exercise, is the most universally used physical therapy for women with stress urinary incontinence (SUI) (Dumoulin, et al., 2018). Pelvic floor muscle training includes repeated contractions of the muscles of the pelvic floor, squeezed and lifted then relaxed several times. As exercises can improve the muscles strength, muscle endurance, that the muscle, and enhance coordination. So, the muscle squeezes rigorously when the risk of leaking is supreme, e.g., with a sneeze or cough (Herderschee et al., 2011). Researches performed on different populations reported that PEME can improve up to 70% of the patients suffered from SUI. (Park & Kang, 2014).

Nurses' role is encountered in giving the implications of the problem of incontinence for women, individuals, the family and the community. Their role is being emphasized on prevention of incontinence, improving and promoting quality of life for patients with continence problems. Nurses can today change the circumstances of incontinence, just by beginning with the basics of incontinence, dealing with the underlying causes and then moving to the specific treatment (Sandip & Edward, 2017; McClurg, 2013).

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

Pelvic floor health is an important aspects of women's health that is usually neglected.. However, pelvic floor health are often addressed only after symptoms have existing. Urinary incontinence is one of the major problem that affects female's quality of life, since it disturbs about third of adult females, moreover, the economic costs that associated with UI are huge (Mishra et al., 2015).

Incontinence is approximately six times more common in females than in males, which often viewed the incontinence as a condition exclusive to females (Lacey, 2012). In addition, researches reported that the incidence of urinary incontinence among patients on radiotherapy reached to 45% (Lieberman, Mehus, Elliott, 2014).

Urinary incontinence is associated with disgrace, anxiety, shame and muteness. It also affects the patient's self-confidence and self-respect, because, they often choose to hide the problem for as long as they can. Moreover, incontinence has been shown to affect personal relationships and cause patients to cut out work, increase dependence on caregivers and limit daily living activities. Thus, it is difficult to establish the true prevalence of urinary incontinence, in order to manage it. Health care providers must be attentive and introduce the subject with all women who are vulnerable to be included. By doing so, they may be able to improve female patient concerns and suggest a variety of noninvasive modalities that will enhance the quality of life for these patients.

There are many advantages for PFME as it is non-invasive, non-pharmacological, with no side effects, the most cost-effective treatment, and differs from other therapies in that the patients can do them by themselves anytime, anywhere, while doing other work, and without regular hospital visits. Pelvic floor muscle exercises are most effective with female who have SUI but can also be effective in females with urge urinary incontinence.

### **1.2. Aim of the study**

The aim of the current study was to examine the effect of pelvic floor muscle exercise on stress urinary incontinence among women on pelvic radiation.

### **1.3. Research hypotheses**

In order to accomplish the research aim, the following hypotheses were suggested:

H1: The study group who received PFME had lower mean quality of symptoms' scores when compared to the control group who received routine hospital care.

H2: The study group who received PFME had significant lower mean incontinence severity scores when compared to the control group who received routine hospital care.

H3: The study group who received PFME had significant lower mean incontinence impact scores when compared to the control group who received routine hospital care.

H4: The study group who received PFME had higher mean knowledge related incontinence scores when compared to the control group who received routine hospital care.

## **2. Methodology**

### **2.1. Research design**

A non-equivalent interrupted quasi-experimental (pre-post) control design was utilized in the current study. The design was used to estimate the causal impact of an intervention (pelvic floor muscle exercise) on a dependent variable (stress urinary incontinence) (Campbell & Stanley, 2015).

## 2.2. Setting

The study was conducted at the Radiology Department in the Oncology Unit in one of the biggest teaching hospitals in Cairo City, Egypt.

## 2.3. Sample

A convenient sample of adult female participants was recruited for the study. The total sample size was calculated according to G\*power 3.1 with 90% of statistical power, 95% confidence interval, 5% level of significance and 10% proportion of attrition. A sample of 60 adult female participants was recruited and they were randomly assigned into study and control groups (30 participants each). Inclusion criteria include: (1) Adult female participants on pelvic radiation (2) had scored more than 10 on the Questionnaire for Urinary Incontinence Diagnosis (QUID) (3) studios on practicing PFME for six weeks. While the exclusion criteria include: had neurological disorders (e.g., multiple sclerosis, cerebrovascular stroke), recently operated for urology surgery (since three months), current urinary infection, hysterectomy, diabetes mellitus, and participants who performed PFME on a sporadic manner.

## 2.4. Tools

Five tools were used to collect the data in order to achieve the objective of the current study

**Demographic and medical data sheet:** Consisted of items seeking information about the background of the subject such as; age, marital status, and educational level. Medical related information includes medical diagnosis and number of radiation sessions.

**Questionnaire for Urinary Incontinence Diagnosis (QUID) (Bradley et al., 2005):** The QUID was used to diagnose the stress urinary incontinence, for appropriate subject recruitment. The tool consists of 6 questions regarding the clinical manifestations of incontinence such as leak of urine during sneeze, lift, exercise and so on, as well as, the quality of symptoms. The scale ranged between 0 (none of the time) to 6 (all of the time), with total scores 36. A subject was illegible to the current study if she had scored more than 10. Test-retest reliability of the QUID for patients with stress urinary incontinence is excellent (0.91).

**The Incontinence Severity Index Scale (ISIS) (Sandvik, et al., 1993):** The Incontinence Severity Index Scale developed by Sandvik et al., (1993) to assess severity of incontinence. The severity index is calculated based on frequency and amount of leakage. It is composed of 2 questions. Frequency of UI with 4 possible scores from 1= once or less/month, to 4= every day, and amount of UI with 2 possible scores; 1= only drops or a little amount, 2= more than a little. The total score ranged from 1-6, the higher the score the greater the severity of the incontinence. The scale was valid and reliable (test-retest reliability was 0.88).

**Incontinence Impact Questionnaire (IIQ) (Handa & Massof, 2004):** The Incontinence Impact Questionnaire (IIQ) is a self-administered 30 items questionnaire used to assess the effect of UI on quality of life. The 30 items are further divided into 4 domains or subscales which include physical activity (6 items), travel (6 items), social relationships (10 items), and emotional health (8 items). Each participant rated the extent to which UI affected her daily life functions on a 4-point ordinal scale (1 = not at all; 2 = slightly; 3 = moderately; 4 = greatly). A low score signifies a better quality of life compared to a high score. The IIQ demonstrates good subscale internal reliability (physical activity 0.87, social relationships 0.90, travel or transportations 0.67, emotional health 0.90), and also has good face validity, construct validity, criterion validity, and is sensitive to change 94.

**The Incontinence Quiz Scale (IQS) (Branch et al., 1994):** The Incontinence Quiz Scale was used to measure knowledge about UI. It consists of 14 questions. The instrument was developed to elicit beliefs and knowledge regarding the definition of incontinence, simple pathophysiological changes that can cause the incontinence and treatments toward incontinence. The correct answer had score (1) while the wrong answer had score (0) with total scores ranged from 0–14, higher scores indicate greater knowledge. The participant is considered as having satisfactory knowledge if she had score 8 or more (approximately 60 % of the total knowledge scores). The Cronbach's alpha reliability has been reported 0.78.

## 2.5. Ethical considerations

An official permission was taken from the hospital administrators. Each participant was informed about the nature and purpose of the study. Then, consents were obtained from all participants for involvement in the study. The researchers highlighted that participation in the study was entirely voluntary; that anonymity and confidentiality were assured through coding the data. Moreover, they were assured that the intervention used in the current study was safe. They were also informed that they can withdraw from the study at any stage.

## 2.6. Pilot Study

A pilot study was conducted on 6 participants at the Radiotherapy Unit, and these participants were excluded from the main study sample. The objectives of the pilot study were to fill in the entire questionnaires and to clarify the questions (whether any question was unclear or ambiguous). Minor modifications were done for some

mysterious statements, otherwise, almost all items were clearly understood and the responses were found appropriate. Modifications were done on the final forms of the tools. The result of the pilot study confirmed that the study is feasible.

## 2.7. Procedure:

The study was conducted on the following phases; preparatory, implementation and evaluation phase:

**Preparatory phase:** An official permission was granted to proceed with the proposed study from the appropriate authoritative personnel. The potential subjects who met the inclusion criteria were interviewed individually to explain the nature and purpose of the current study. After that, the researchers obtained consent from the participants who agreed to participate in the study, then, the QUID was applied to the potential subjects and those who had score more than 10 were eligible in the current study. Demographic data sheet, Incontinence Impact Questionnaire, The Incontinence Quiz Scale, and The Incontinence Severity Index Scale were filled in as base line information.

**Implementation phase:** In the implantation phase, both study and control groups received the routine hospital care. As well, the study group teaching sessions were demonstrated in order to teach them PFME technique, it took about 20–30 minutes. In addition to the teaching sessions, each participant was provided by A brochure which includes photos that illustrate how to perform the PFME technique. It was in Arabic language and written in simple clear words. Further guidance for each participant was provided to help her to self-administer the technique by providing an Arabic video on the researchers' mobiles and for participants who were willing to take the video on their mobiles, the researchers did it. The video contains an introductory information regarding definition of incontinence, simple pathophysiological description of incontinence, treatments of the stress urinary incontinence, and ended by demonstration of the steps of PFME. Those participants were followed up for six weeks.

### Pelvic muscle exercise technique

#### **I. Instructions on how to perform pelvic floor muscles exercise:**

First, a participant needs to learn which muscles to tighten. In order to do so, the participant was instructed to:

1. Sit on a chair with knees slightly apart.
2. Imagine that she is trying to stop the flow of urine, squeeze and relax the muscles around the back passage, the skin around the back passage pulled up and away from the chair.
3. Tighten the muscles around the back passage, vagina and front passage and lift up inside as if trying to stop passing urine.
4. Don't squeeze the legs or tightening the buttocks as well as don't hold the breath.
5. Test the ability to reach the right muscle, by tightening the pelvic muscles during actual urinating to stop the flow of urine. Tighten and relax the muscles to start and stop the flow of urine two times.
6. Do this only one time to test the ability to contract the right muscle. Normally, when the participant does the exercises she should not stop the flow of the urine, because this can hurt the bladder. When the participant can slow or stop the flow of urine, she has successfully located these muscles.

#### **II. Practicing the pelvic floor muscle exercises**

After the participant learns which muscles to tighten, and doing the exercises in any position (sitting in a chair or lying down), there is no need to do the exercise in the bathroom. Follow these steps to do pelvic floor exercise:

1. Void before the exercises.
2. Slowly contract the pelvic floor muscles as hard as the participant can for 5 seconds, then relaxing the muscles. Rest for 4 seconds and then repeat the contraction.
3. Breathe while holding muscles contracted
4. Build up the strength until doing 10 slow contractions at a time, holding them for 10 seconds each, with rests of 4 seconds in between.
5. Over time, try to hold the contraction harder and for a longer time.
6. The muscle also requires training to react quickly to any sudden pressure occurs on the bladder such as during coughing. So, perform quick squeezing the muscle, hold it for just one second and then relaxing the muscle, with up to ten quick contractions in succession.
7. The exercise has to be done for 3 times per day.

**Evaluation phase:** The researchers assessed the quality of incontinence symptoms using the QUID, the severity of incontinence using the ISIS, and the impact of the incontinence using the IIQ by the end of the 3rd week and 6th week, and the participants knowledge using the IQS by the end of 6th week for all participants either study or control groups.

## 2.8. Statistical Data Analysis:

The collected data were scored, tabulated and analyzed by personal computer using statistical package for the social science (SPSS) program, version 20. Descriptive as well as inferential statistics were utilized to analyze

data pertinent to the study. Descriptive statistics including frequency, distribution, means, and standard deviation were utilized. t-test and Chi square test were used to compare between results of study and control groups. ANOVA was used to compare results of repetitive responses. Level of significance was adopted at  $p < 0.05$ .

### 3. Results

Findings of the study were presented in two main sections: I. Description of the study female participants' characteristics and the medical related data. II. Comparison of mean scores between the study and control groups on the base line, after 3 weeks and after 6 weeks in relation to quality of symptoms, incontinence severity scores, incontinence impact scores and knowledge scores.

#### 3.1. Section: I: Description of the studied female participants' characteristics and the medical related data.

Table (1): Frequency and Percentage Distribution and Comparison Between Control and Study Groups' Demographic Characteristics (n = 60).

Variables	Control group (n=30)		Study group (n=30)		Statistical test	P - value
	No	%	No	%		
Age:					t-test: 1.28	0.2
40 - <45	5	16.7	4	13.3		
45 - <50	8	26.7	8	26.7		
50 - <55	9	30	8	26.7		
55 and more	8	26.7	10	33.3		
Mean $\pm$ SD	51.5 $\pm$ 10.2		54.7 $\pm$ 11.1			
Education:					X <sup>2</sup> : 0.56	0.75
Illiterate	8	26.7	9	30		
Read & write	5	16.7	4	13.3		
Basic education	4	13.3	4	13.3		
Secondary education	12	40	11	36.7		
University	1	3.3	2	6.7		
Marital status:					X <sup>2</sup> : 0.058	0.99
Married	16	53.3	15	50		
Unmarried	14	46.7	15	50		
Occupation:					X <sup>2</sup> : 0.284	0.793
Employed	20	66.7	18	60		
Housewife	10	33.3	12	40		
Residence:					X <sup>2</sup> : 0.62	0.69
Rural	14	46.7	17	56.7		
Urban	16	53.3	13	43.3		

\*P-value  $\leq 0.05$

Table (1) presents the participants' age, 30% and 26.7% of the control and study groups respectively their age ranged between 50 to less than 55 years, with a mean+SD age of 51.5  $\pm$  10.2 and 54.7  $\pm$  11.1 for both groups respectively. It also shows that 40% of the control group and 36.7% of the study group had secondary education. In relation to marital status 53.3% and 50% of the control and study groups respectively were married. As for occupation, 66.7% and 60% of the control and study groups respectively were employed. Moreover, there were no statistically significant differences between the study and control groups regarding all demographic variables.



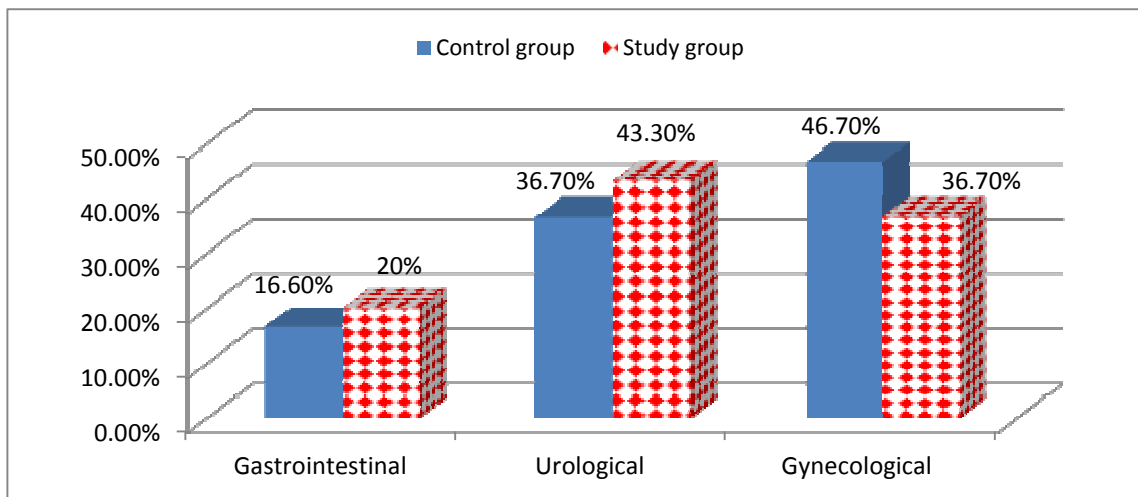


Figure (1) Percentage Distribution of the Medical Diagnosis of the Control and the Study Groups (n= 60).

Figure (1) shows that 36.7% of the control group and 43.3% of the study group had urological cancer (bladder cancer). In addition, 46.7% and 36.7% of the control and study groups respectively suffer from gynecological cancers (vagina, cervix & vulva). Moreover, there was no statistically significant difference between the control and study groups regarding medical diagnosis ( $X^2= 0.61$ , p-value= 0.90).

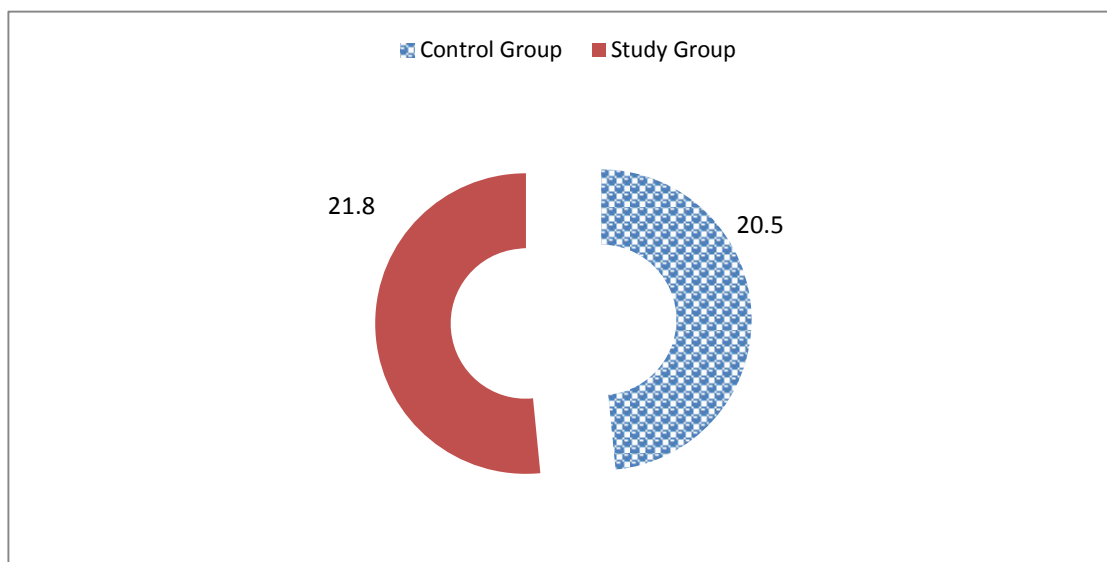


Figure (2) Mean of the Number of Radiotherapy Sessions of the Control and the Study Groups (n= 60).

Figure (2) shows that the means  $\pm$  SD of number of radiotherapy sessions among the control and study groups were  $20.5 \pm 2.4$ , and  $21.8 \pm 3.2$  respectively. Moreover, there was no statistically significant difference between the control and study groups regarding number of radiotherapy sessions (t-test= 1.78, p-value= 0.1).

**3.2. Section II: Comparison of mean scores between study and control groups on the base line, after 3 weeks, and after 6 weeks in relation to quality of symptoms, incontinence severity scores, incontinence impact scores and knowledge scores.**

Table (2): Comparison of Mean Incontinence Quality of Symptoms Scores Between Control & Study Groups (n= 60).

Study period	Mean $\pm$ SD		t-test	p-value
	Control group (n=30)	Study group (n=30)		
1st week	22.8 $\pm$ 2.8	22 $\pm$ 3.1	1.05	0.10
3rd week	20.1 $\pm$ 2.6	14.8 $\pm$ 3.9	6.23	0.000*
6th week	21.2 $\pm$ 5.2	9.8 $\pm$ 4.5	8.76	0.000*

\*P-value  $\leq 0.05$

Table (2) shows that there was no statistically significant difference between the study and control groups

(t-test= 1.05, p-value= 0.10) at 1st week in relation to quality of symptoms. However, there were statistically significant differences between the two groups on the 3rd week (t-test= 6.23, p-value= 0.000) and 6th week (t-test= 8.76, p-value= 0.000).

Table (3): Comparison of Mean Incontinence Severity Scores Between Control & Study Groups (n = 60).

Study period	Mean±SD		t-test	p-value
	Control group (n=30)	Study group (n=30)		
1st week	5.4±0.8	5.4±0.6	0.36	0.722
3rd week	5.3±0.6	4.5±1.2	3.58	0.001*
6th week	5.1±0.7	3.9±1	6.47	0.000*

\*P-value ≤ 0.05

Table (3) shows that there were statistically significant differences between the study and control groups after program implementation (3rd & 6th weeks) regarding mean incontinence severity scores, while there was no statistically significant difference between them in the 1st week (t-test= 0.36, p-value= 0.722).

Table 4: Comparison of Mean Scores of Incontinence Impact Questionnaire Between Control and Study Groups (n = 60)

Variables	1st week		3rd week		6th week	
	Control	Study	Control	Study	Control	Study
Physical activity Mean±SD	19.6±3.5	19.4±2.2	20.1±1.1	17.8±1.9	19.9±1.2	15.1±3.3
t-test	0.301		7.089		7.610	
p-value	0.766		0.000*		0.000*	
Travel or transportation Mean±SD	21.6±0.89	21.2±2.2	21.6±1	19.1±2.5	21.2±1.1	16.8±3
t-test	0.959		5.74		8.163	
p-value	0.345		0.000*		0.000*	
Social relationships Mean±SD	33.9±3.8	33.2±3.1	33.7±3.7	30.9±3.9	33.3±3.8	27.2±4.7
t-test	0.910		3.263		6.197	
p-value	0.370		0.003*		0.000*	
Emotional health Mean±SD	27.2±2.6	27.7±2.4	27±2.3	25.3±3	26.7±2.4	22±3.8
t-test	1.178		3.313		8.099	
p-value	0.248		0.002*		0.000*	
Total scores Mean±SD	102.8±6.8	101.2±8.8	102.5±6.7	92.3±9.7	101.5±7.5	80.5±12.6
t-test	0.952		6.092		8.942	
p-value	0.349		0.000*		0.000*	

\*P-value ≤ 0.05

Table (4) reveals that there was no statistically significant difference between control and study groups in relation to sub scales of the incontinence impact scale, and total scores of the incontinence impact (t-test= 0.952, p-value= 0.349) in the 1st week. However, in the 3rd and 6th weeks, the mean of the subscales as well as total incontinence impact scores decreased in the study group in comparison to control group with statistically significant differences between both groups (t-test= 6.092, p-value= 0.000 & t-test= 8.942, p-value= 0.000 respectively).

Table (5): Frequency and Percentage Distribution of Level of Satisfactory Knowledge Scores Related Stress Urinary Incontinence of Control and Study Groups (n = 60)

Study period	Control group (n=30)		Study group (n=30)	
	No.	%	No.	%
1st week	8	26.7	6	20
6th week	13	43.3	25	83.3

Table (5) shows that 26.7% and 20% of the control and study groups respectively had satisfactory level of knowledge regarding urinary incontinence in the 1st week. By the end of 6th week, 43.3% of the control group and 83.3% of the study group had satisfactory level of knowledge.

Table (6): Comparison of Mean Score of Knowledge Related Urinary Incontinence Between Control and Study Group (n = 60).

Study period	Mean±SD		t-test	p-value
	Control group (n=30)	Study group (n=30)		
1st week	5.8±2.1	6±1.9	0.321	0.757
6th week	7.4±0.5	10.3±2.1	7.431	0.001*

\*P-value ≤ 0.05

Table (6) shows that there was no statistically significant difference between control and study groups in the 1st week (t-test= 0.321, p-value= 0.757), while in the 6th week, the mean knowledge scores in the study group increased in comparison to the control group with a statistically significant difference between them (t-test= 7.431, p-value= 0.001).

#### 4. Discussion

Urinary incontinence, the involuntary loss of urine, is a common public health concern among women worldwide, it is pelvic floor disorders associated with cancer and its treatments with adverse effects on their quality of life (QoL) (Al-Hasni, 2017 ; Christopher, 2017). Stress incontinence is the most common type of urinary incontinence in women. Despite the extent of the problem, there is good evidence that PFME is effective in the treatment of stress incontinence (Lukacz, et al., 2017). In a recent study, Christopher (2017) highlighted that treatment for urinary incontinence should be personalized based on the frequency and severity of symptoms and on individual participant preferences.

This study aimed to examine the effect of PFME on stress urinary incontinence among women on pelvic radiation. It comprised 60 adult female participants divided into two groups, study and control, 30 participants each at the oncology unit in one of the biggest teaching hospitals in Cairo City, Egypt.

According to the present study inputs, the highest percentages of women in the whole sample had secondary school education, were employed, and were living in urban areas. In addition, relatively high percentages of women in the whole sample had urological and gynecological cancers. The research findings revealed that there were no statistically significant differences related to the demographic data as well as medical data, so homogeneity of the control and the study groups was achieved.

Findings of the present study revealed that, there was no statistically significant difference between the study and control groups at 1st week in relation to quality of symptoms as leak of urine during sneeze. However, there were statistically significant differences between the two groups on the 3rd week and 6th week after implementing the PFME to the study group, whereas the study group had lower mean quality of symptoms scores, which may indicate that quality of symptoms improved in the study group when compared to control group. The researchers attributed to that the practice of PFME for 6 weeks could help to strengthen the pelvic muscles that may lead to improve the urinary incontinence symptoms such as urine leakage during squeezing, lifting objects or doing exercise.

These findings agreed with the results of Dumoulin and Hay Smith (2010), who reported that, women with SUI who were included in the PFME group were more likely to report cure or improvement of the UI symptoms than women in the control group. As well, women with SUI were more satisfied with the active treatment, while women in the control group were more likely to seek further treatment. Moreover, this finding also coincided with that of Schmidt et al., (2009) in their study to assess the improvement of quality of symptoms in women with SUI who received PFME. In addition, Bilgic et al., (2017), who conducted a study to describe the coping strategies and help-seeking behaviors of women with urinary incontinence, reported that symptoms resulting from UI were very irritating in 56.4% of their study sample.

As regards to mean incontinence severity scores, the current study findings present that there was no statistically significant difference between the study and control groups in the 1st week, while, there were statistically significant differences between both groups after implementing the nursing instructions on PFME to the study group at 3rd and 6th weeks whereas, the study group had lower mean incontinence severity scores which may indicate an improvement in the study group when compared to the control group. Apparently it was clear that over time of application of the PFME, the study group incontinence severity status was improved and this could be explained, as the researchers were continuously confirming with participants, the importance of the continuity to practicing the exercise. This was expected as the study group found that PFME intervention is easy to apply as well as it's beneficial.

These results come in the same line with the findings of Dumoulin and Hay Smith (2010), as they found that women managed with PFME leaked less often urine, lost smaller amounts, and void their bladders less often during the day. In addition, these findings are similar with those of the study done by Younes et al., (2012), who found that, after implementation of the PFME, significant improvement was shown among most females in the study group. Moreover, Xu et al. (2015) reported that the severity of UI experienced could be a significant



determinant factor for women and could be related to the wetness felt and the level of its effects on the quality of life.

After implementation of the PFME in the current study, statistically significant improvements were detected among women in the study group, as, there was no statistically significant difference between the control and study groups in relation to sub-scales of the incontinence impact scale in the 1st week. However, in the 3rd and 6th weeks after the implementing the PFME to the study group, the mean of the subscales as well as total incontinence impact scores, decreased in the study group in comparison to the control group with statistically significant differences between both groups. Interestingly, this finding can be interpreted in the light of the previous findings, whereas, there is a matching between the study results as it was expected that the incontinence impact on quality of life improved as a consequence of symptoms of urinary incontinence and the incontinence severity scores improved among the study group.

The four domains of the incontinence impact on QoL, physical activity, travel or transportation, social relationship, and emotional health were improved. This might be a result of the studied participants who were continuously practicing PFME could keep muscle squeezes more harder, this means that involuntary loss of urine was decreased during physical activities which may consequently improve other subscales of the incontinence impact sub-items as well as the total scores. This successful outcome of the study group is in congruence with the findings of Park and Kang (2014), who conducted their study to evaluate the effect of PFME on reducing urinary incontinence symptoms in women with SUI. Nonetheless, Delarmelindo et al. (2013) reported that UI has a significant effect on activity of daily living, and mental health, in both male and female.

As regards knowledge related to SUI, the current study found that, there was no statistically significant difference between the control and study groups in the 1st week, while in the 6th week after implementing the nursing instructions on PFME to the study group, the mean knowledge scores in the study group increased in comparison to the control one with statistically significant differences between them. These findings are similar to those of the study done by Day et al. (2014), who studied the community-dwelling women's knowledge about urinary incontinence. The findings suggested that, participants had poor knowledge of UI, and the study group became more knowledgeable after the application of the educational program than the control group.

It was very interesting to notice that all participants in the study group took a copy of the Arabic video on their mobile phone, which shows the steps of practicing PFME and brief introductory information regarding stress urinary incontinence. They reported that the video helped them to easily recall the intervention. The video of the intervention could be one of this study's strength as it assured the participant's adherence over the period of the intervention as well as after the study completed. In this respect, Youssef and Salah El-Deen (2018), reported that, videos were highly valuable and recommended as a method to improve patients' understanding of knowledge as well as apply demonstrative exercises.

Based on the improvement of the symptoms of urinary incontinence, incontinence severity, incontinence impact and knowledge related to stress urinary incontinence, status of participants in the study group revealed from the current study; it was crucial to focus on that the effects of PFME on stress urinary incontinence will be verified through a systematic review of the results of the studied sample, forming a basis for the suggestion that PFME is an economic intervention which can be understood and performed by both participants and nurses alike, in order to decrease the risk of the future complications which might affect those patients. So, hopefully this study plays a corner stone in the nursing future chain of stress urinary incontinence program support.

## 5. Conclusion

The study results concluded that application of PFME had significantly decreased quality of incontinence symptoms; severity of incontinence scores as well as the mean incontinence impact scores among the study group when compared to the control group. Moreover, the teaching sessions regarding the SUI improved participants' knowledge in the study group than the control group. In conclusion, the research findings supported the four research hypotheses.

## 6. Recommendations of the Study

Based on the study results, the following recommendations were suggested:

1. Applying PFME is recommended to be included as a nursing practice for participants who are scheduled pelvic radiation and suffer from urinary incontinence.
2. Further studies may be needed to determine the stability of the effect of the PFME on UI among participants on pelvic radiation.
3. Replication of this study among a larger sample from various settings and various medical diagnosis is requested to generalize the results.

## 7. Implications to nursing practice

Considering implications for practice, there is growing emphasis on the role of the nurse in implementing

interventions that focus on reduction of risk of long term complications of chronic illnesses as cancers. Therefore, the nurse would have a pivotal role in implementation of the PFME in order to reduce the risk of complications. As regards for nursing education, the PFME would provide a framework and content to be taught in basic and continuing education programs. Moreover, implications for research, implementation of the PFME in other clinical settings and with different participant populations such as in gynecological disease would provide additional evidence of its effectiveness. Clinical settings that may use the PFME are urology outpatient clinics, and geriatric centers.

## References

- Al-Hasni, A. A. (2017): Urinary incontinence and women's quality of life in, OMAN, Southern illinoisat Carbondule, Proquest Dissertations, 10640575.
- Bilgic, D., Kizilkaya Beji, N., Ozbas, A., Cavdar, I & Yalcin, O. (2017): Approaches to cope with stress and depression in individuals with urinary incontinence, *Gynecol Obstet Invest*; 82:181-187.
- Bradley, C.S., Rovner, E. S., & Morgan, M.A., et al. (2005): A new questionnaire for urinary incontinence diagnosis in women: Development and testing. *Am J Obstet Gynecol*; 192: 66-73.
- Branch, L.G., Walker, L.A., Wetle, T.T., DuBeasu, C.E., & Resnick, N.M. (1994): Urinary incontinence knowledge among community dwelling people 65 years of age and older. *Journal of American Geriatrics Society*; 42(12): 1257-1262.
- Campbell, D. T., & Stanley, J. C. (2015). *Experimental and quasi-experimental designs for research*. Ravenio Books.
- Christopher, C.M. (2017): Urinary incontinence in women, *JAMA*, 318(16):166. doi:101001/jama.2017.557/.
- Daniel, L., Brian, M., & Sean, P.E. (2014): Urinary adverse effects of pelvic radiotherapy. *Transl Androl Urol*. Jun; 3(2): 186–195. doi: 10.3978/j.issn.2223-4683.2014.04.01.
- Day, M.R., Patricia, L.W., & O' Sullivan, E. (2014): Community –dewelling women's knowledge of urinary incontinence, Nov; 19 (11): 534-538.
- Delarmelindo, R.C., Parada, C.M, Rodrigues, R.A., & Bocchi, S.C. (2013): Women's strategies for coping with urinary incontinence. *Rev Esc Enform USP*; 47:296-303.
- Dumoulin, C.I., Hay-Smith, E.J., Mac Habée-Séguin, G. (2018): Pelvic floor muscle training versus no treatment, or inactive control treatments, for urinary incontinence in women, *Cochrane Database Syst Rev.*; 14(5):CD005654. doi: 10.1002/14651858.CD005654.pub3.
- Dumoulin, C., & Hay Smith, J. (2010): Pelvic floor muscle treatment versus no treatment, or inactive control treatments, for urinary incontinence in women. *Cochrane Database Syst Rev*;(1). Art. No. CD005654.
- Favro, M., Billia, M., Volpe, A., Zacchero, M., & Terrone, C. (2016): Long-term outcomes of the implant of a periurethral constrictor for stress urinary incontinence following radical prostatectomy. *Urol Int*; 97:26-31.
- Handa, V.L., & Massof, R.W. (2004): Measuring the severity of stress urinary incontinence using the Incontinence Impact Questionnaire. *Neurourol Urodyn.*; 23:27-32.
- Herderschee, R., Hay-Smith, E., Herbison, G., Roovers, J., Heineman, M. (2011): Feedback or biofeedback to augment pelvic floor muscle training for urinary incontinence in women. *Cochrane Database Syst Rev.*; 6(7): doi: 10.1002/14651858.CD009252.
- Ibrahim, A., Khaled, H., Mikhail, N., Baraka, H., Kamel, H. (2014): Cancer incidence in Egypt: Results of the National Population-Based Cancer Registry Program. *Journal of Cancer Epidemiology*, 1-18.
- Lacey, M. (2012): Managing urinary incontinence after a cancer diagnosis can be managed. *Cancer updates, research and education* published December 17.
- Liberman, D., Mehus, B., & Elliott, S. (2014): Urinary adverse effects of pelvic radiotherapy, *Transl Androl Urol*;3(2):186-195.
- Lukacz, E.S., Santiago-Lastra, Y., Albo, M.E. & Brubaker, L. (2017): Urinary incontinence in women: A Review. *JAMA.*, Oct., 24;318(16):1592-1604.
- McClurg, D. (2013): Improving continence education for nurses. *Nursing Times*, January; available <https://www.nursingtimes.net/.../continence/..continence-education...nurses/5053995>.
- Mishra, G.D., Barker, M.S., Herber- Gast, G.C. & Hillard, T. (2015): Depression and incidence of urinary incontinence symptoms among young women: results from a prospective cohort study. *Maturitas*; 81:456-461.
- Park, S.H., & Kang, C.B. (2014): Effect of Kegel Exercises on the management of female stress urinary incontinence: A Systematic Review of Randomized Controlled Trials. *Advanced in Nursing*. Hindawi Publishing Corporation. Volume 2014, Article ID 640262, 10 pages.
- Sandip, P.V., & Edward, D.K. (2017): Urinary incontinence: Practice essentials, background, anatomy. Available at: <https://emedicine.Med scap.com/article/452289-overview>. Accessed July, 2018.
- Sandvik, H., Hunskaar, S., Seim, A., Hermstad, R., Vanvik, A., & Bratt, H. (1993): Validation of a severity index in female urinary incontinence and its implementation in an epidemiological survey. *Journal of*

- Epidemiology & Community Health, 47(6), 497-499.
- Schmidt, A.P., Sanches, P.R., Silva, D.P, Ramos, G.L. & Nohama, P. (2009): A new pelvic muscle trainer for the treatment of urinary incontinence. *Int J of Gynecology and Obstetrics* 06189; 5.
- Younes, E.M., Ahmed, E.R., Mahmoud, G.A. & Mohamed, S.R. (2012): Impact of kegel's exercise on reducing post partum stress urinary incontinence. *Egyptian Journal of Nursing*; 1 (4): 42-55.
- Youssef, N. & Salah El-Deen, D. (2018): The effect of breathing exercises and sleep hygiene instructions on insomnia and pain in patients with burn injuries, *Journal of Health, Medicine and Nursing*; 53: 21-33.
- Xu, D., Wang, X., Li, J., Wang, K. (2015): The mediating effect of 'bothersome' urinary incontinence on help-seeking intentions among community-dwelling women. *J Adv Nurs*;71(2): 315-25.