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Effect of Kegel's Exercise on Severity of Urinary Incontinence and Quality of Life among Menopausal Women

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Abstract: **Urinary incontinence is a complex and serious condition that can affect menopausal women. It is not only a serious medical condition but also an undeniable psychosocial problem and it has a severe impact on a woman's quality of life. Aim of the study: was to determine the effect of kegel's exercise on severity of urinary incontinence and quality of life among menopausal women. Research design: A quasi experimental research design with a pretest-posttest control group was utilized. Settings: The study was conducted at obstetric and gynecological outpatient clinic and Urological outpatient clinic at National Medical Institution in Damanhour, Albehera Governorate. Subjects: A purposive sample of 80 menopausal women with urinary incontinence was selected according to eligibility criteria. They were divided into two equal groups 40 (study group and control group). Tools of data collection: Four tools were used for data collection namely: A structured interview schedule, the PRAFAB-Questionnaire scale, Brink digital pelvic muscle scale and the king's health questionnaire. Results: the study results revealed that there was a statistically significant difference between the study and control groups in favor of the former in relation to severity of urinary incontinence, pelvic floor muscle strength and quality of Life after twelve weeks of intervention where P = .000. Conclusion: The study concluded that Kegel's exercise has significant positive effect on strengthens pelvic floor muscle, reducing severity of UI and significantly improves the quality of life of menopausal women with urinary incontinence.**

Keywords: **Kegel's exercise, Menopausal women, Quality of life, Urinary incontinence.**

I. INTRODUCTION

Urinary incontinence (UI) is one of the most common problems in menopausal women; it is defined by the International Continence Society (ICS) as the complaint of any involuntary loss of urine and its classification according to the presence of symptoms and pathophysiological mechanisms of occurrence. (1) According to the Standardization Committee of ICS, there are three main types of urinary incontinence: Stress Urinary Incontinence (SUI), Urge Urinary Incontinence (UUI) and Mixed Urinary Incontinence (MUI). (2) SUI is the most common type of UI in 50% of women between 15 and 64 years. It is defined by the International Uro-gynecological Association and the ICS as a complaint of involuntary loss of urine on physical exertion such as (e.g. sporting activities, on sneezing or coughing). (2, 3) It results from failure of the sphincter mechanism to maintain outlet closure during bladder filling and increased intra-abdominal pressure during sneezing, coughing, running, laughing or exertion of greater physical effort. (4) UUI is the complaint of involuntary loss of urine from the urethra with abrupt urgency, frequency and nocturia. There are different forms of UUI such as small but frequent losses between or immediately before micturition or larger leaks with complete bladder emptying. MUI is a mixture of urge and stress incontinence. (5, 6)

Urinary incontinence is a major global health problem. The prevalence of UI is relatively low early in life, has a peak around the time of menopause and rise steadily between the age of 60 and 80 years. [7] Review of several American and European reports identified a 10–40% range of prevalence of UI. [8] The prevalence rate of UI in Germany and Denmark was 48.3 and 46.4% respectively. [9] In Egypt UI prevalence is difficult to estimate because of most Egyptian women are refused to seek help regarding UI, they do not report incontinence when visiting their health care providers, the belief that UI is a natural consequence of ageing & childbirth and embarrassment so more studies should be carry out to estimate the exact prevalence of UI in Egypt. [10] But there are a few studies which scrutinized the prevalence rate of UI in some Egyptian districts. A study conducted by Bahloul et al (2017) in Assiut reported that, the overall prevalence of UI was 22.2% and the prevalence of stress UI, urge UI and mixed UI was 5.7%, 5.1% and 11.4% respectively. [11] Also El-mowafy et al (2010) in Port-Said City reported that, the overall prevalence of UI was 66.5% and the prevalence of mixed, urgency and stress UI was 68.6%, 24.1 % and 7.3% respectively. [12] Another study conducted by El-Azab et al (2007) in Assiut city reported that the prevalence rate of UI is 54.8% among Egyptian women. [13]

Many risk factors have role in the occurrence of UI, these factors are: weak pelvic floor muscles supporting the proximal urethra, obesity, pregnancy and childbirth, menopause and old age, hysterectomy, constipation. The risk of developing UI increases with drinking caffeine or alcohol which fill the bladder quickly, infections of the urinary tract may cause temporary UI, nerve damage can interrupt signals from the bladder to the brain so patients don't experience the urge to urinate and certain medications all these factors can definitely impact the ability to control urination.[14,15]

Urinary incontinence is a major health problem in menopause and affects almost 56% of menopausal women. [16] Menopause is considered one of the critical stages of women's lives and is unavoidable. [17] Menopause is a stage when the menstrual cycle stops for longer than 12 months and there is a drop in the levels of estrogen and progesterone, which leads to a series of bodily changes including urogenital manifestations. [18, 19] With the onset of the menopause, the ovaries stop producing considerable quantities of estrogen; hence the symptoms and problems associated with estrogen deficiency occur gradually. Among the changes is reduction in the integrity of the pelvic floor, changes in the rate of different types of collagen and the preferential atrophy of type II muscle fibers, atrophy of urinary-genital tract which may be associated with problems such as urinary urgency, urinary frequency, nocturia, stress incontinence, urge incontinence, burning upon urination and an increased prevalence of urinary tract infections. Also fragile vaginal mucosa leads to dyspareunia. [20, 21] The presence of these changes raise doubts in regards to the real effectiveness of conservative treatment for menopausal women with UI. [22, 23]

Despite UI isn't being a life-threatening condition, it is physically debilitating and socially incapacitating. It is one of the most costly health conditions in terms of the financial burden and causes many psychological problems such as; it forces on individuals and society with loss of self-confidence, social isolation, feelings of helplessness, depression and anxiety. It causes women to terminate employment; women are stigmatized by their condition, increase dependence on caregivers and restrict activities of daily life. As a result, it may significantly affecting and decreasing women's quality of life. [24] Also urinary tract infections, cellulitis, sleep deprivation, social withdrawal, sexual and hygienic impact may also occur. All these problems may lead to deteriorated quality of life and increased morbidity but not associated with increased mortality. [25] So many women elaborate coping mechanisms to overcome this problem through voiding frequently, mapping out the location of toilets, drinking less and wearing dark clothing or sanitary towels to mask incontinence episodes. [24, 26]

Quality of life (QoL) of each menopausal woman is considered a main indicator and involved various aspects as physiologic, emotional well-being, social function, general health and mental performance. There is a relationship between UI and QoL of menopausal woman. So paying attention to QoL has a particular importance as the primary goal of treatment is to improve the QoL by reducing the effects of UI on the lives of menopausal women. As a result intervention for incontinence women with physical, mental and social effects to improve their quality of life requires comprehensive theories. [27, 28]

In light of the high prevalence and the psychological, social and economic consequences of UI in menopausal women, it is necessary to determine an effective treatment for this problem. The International Continence Society recommends conservative treatment as the first line of treatment for incontinent women with a focus on increasing strength and correcting activating patterns of the pelvic floor muscles. [22, 29] Conservative approaches are least invasive, least expensive, safe and effective ways to treat UI. The aim of the conservative treatment is to stabilize the urethra by

increasing pelvic floor muscle strength. They include Pelvic Floor Muscles Exercise (Kegel's exercise), lifestyle changes, urinary control devices and medications. [23, 30] Pelvic Floor Muscles Exercises (PFME) is the cornerstone of noninvasive treatment for UI as it strengthens the muscular components of urethral supports by employs a small number of isometric repetitions at maximal exertion. PFME instruction should focus on isolation of pelvic muscles, avoidance of buttock, abdomen and thigh muscle contraction. Moderate repetitions of the strongest contraction possible (3 sets of 8 to 10 contractions held for 6 to 8 seconds 3 to 4 times a week) and contraction for progressively longer times (up to 10 seconds if possible).[31,32]

The first description of pelvic floor muscle exercises was created and published in 1948 by Arnold H. Kegel. He observed that the use of pelvic floor contracting and relaxing exercises in women with urinary incontinence restored deep feeling in the levatorani muscle strengthen the pubococcygeal muscles and teach their conscious control. [33] Over the years, it has been noticed that pelvic floor muscles became more flexible and strengthened due to exercise and this facilitates childbirth, prevent lowering of the reproductive organs and prevent stress urinary incontinence. Kegel recommended starting the exercises with 5 to 25 repetitions a day as the pelvic floor muscles strengthened. The muscle contraction time should be about 8-10 seconds. Over the years, many different sets of exercises to strengthen the pelvic floor muscles have been proposed. However, there is no optimal pattern for performing these exercises as regards the correct number of repetitions, strength and duration of muscle contraction. [34]

Urinary incontinence is a basic nursing care issue, so nurses must be more creative, inventive, and bold in developing new approaches to prevent and manage urinary incontinence. Nursing research must be continued to explore and validate nursing interventions to identify the successful methods to control continence in women with urinary incontinence. Nurses may be the most cost- effective health care provider to deal with UI and they are important resources to incontinent women in assisting with the selection and management of UI. As one of the major roles of nurses is teaching an incontinent woman for the purpose of maintaining optimal health, restoration of normal functions and preventing complications. This can be achieved through teaching women PFME.

Significance of the study:

Urinary incontinence can negatively affect quality of life in many aspects such as physical activities, social interaction, as well as even sexual and psychological well-being. Kegel exercise is one of the suggested solutions to manage the urinary incontinence but, it is still questionable. [35] In spite of the UI is common in Egypt and its prevalence rates are higher when compared to other reports. There is lack of evidence to evaluate the effect of Kegel exercise in reducing the symptoms' severity of urinary incontinence and its impact on quality of life among menopausal women in Egypt, so the current study might provide an evidence and it will be add to the body of the nursing knowledge, also it will help in improving quality of life among menopausal women with urinary incontinence. Therefore this study is done to investigate the effect of Kegel exercise on severity of urinary incontinence and quality of life among menopausal women with urinary incontinence**.**

Aim of the study:

The aim of this study was to determine the effect of kegel's exercise on severity of urinary incontinence and quality of life among menopausal women.

Hypothesis:

H0: Menopausal women with urinary incontinence who practice Kegel's exercise exhibit the same severity of urinary incontinence, pelvic floor muscle strength and quality of life as those who don't practice it.

H1: Menopausal women with urinary incontinence who practice Kegel's exercise exhibit less severity of urinary incontinence, more pelvic floor muscle strength and improve quality of life than those who don't practice it.

II. MATERIAL AND METHODS

Research design:

A quasi experimental research design with a pretest-posttest control group was utilized.

Setting:

The study was conducted at obstetric and gynecological outpatient clinic and Urological outpatient clinic at National Medical Institution in Damanhour, Albehera Governorate. This hospital was selected because flow rate of women with

urinary incontinence is satisfactory for the study. In addition, women attending this hospital represent different socio-economic levels.

Subjects:

The study subjects were selected through a non-probability sampling technique. A purposive sample of 80 menopausal women with urinary incontinence, who were available at time of data collection at the previously mentioned settings, was selected. The sample size was estimated based on the Epi-Info 7 program using the following parameters:

(1) Target population 430 per 3 months;

(2) Expected frequency p = 50%;

(3) Acceptable error = 10%;

(4) Confidence coefficient = 95%;

(5) Sample size = 80.

The study subjects enrolled in this study according to the following inclusion criteria: Menopausal women (absence of menstruation for 12 months) with diagnosed urinary incontinence, aged 50-60 years old, read and write and willing to participate in the study. The researchers excluded women who had diabetic neuropathies, or urinary tract infection, with congenital urological disease, any other associated cardiovascular, orthopaedic or neuromuscular diseases, had tumors of the bladder, vaginal and uterine prolapsed, using hormone replacement therapy and women with morbid obesity.

The selected menopausal women were then divided into two equal subgroups of 40 (study and control).

Tools:

Four tools were used to collect the necessary data

Tool I: ***A structured interview schedule*** it was developed and utilized by the researchers to gather the necessary data: it included the following parts:

- ***Part I*** included socio-demographic characteristic such as age, level of education, occupation, type of work and residence.
- ***Part II*** involved reproductive history such as gravidity, parity, age of youngest child, mode of last delivery and problems associated with last delivery.

Tool II: ***The PRAFAB- Questionnaire scale*****:**

It was a five-item questionnaire developed by Vierhout ME (1990) [36] in the Netherlands. The acronym PRAFAB encompasses the five different aspects of incontinence measured with this tool. The PRAFAB questionnaire was adopted and translated to an Arabic version to be used in the current study. It was originally developed as a brief patient's self-reporting questionnaire for routine clinical use to assess UI leakage severity and perceived impact. The PRAFAB questionnaire combines important objective and subjective aspects of UI severity: *Pr*otection (the use of pads), *A*mount of urine loss, *F*requency of UI, *A*djustment of behavior due to the symptoms and *B*ody (or self) image as a result of the UI symptoms. The range of responses for each item is on a scale of 1 to 4, where 1 is the least severe measure for that item and 4 is the most severe. The total score ranges from a minimum of 5 points to a maximum of 20 points the higher total score is indicative of a more severe condition, where not severe degree of UI was considered as less than 14 points, while severe degree was considered as 14 or more points.[37]

Tool III: ***Brink digital pelvic muscle scale*****:**

It was developed by Brink et al (1989) [38] to measure the strength of pelvic floor muscles. Brink scale is a reliable and valid scale used by the obstetric researchers to measure pelvic floor muscle strength. Brink scale evaluates 3 dimensions, to assess pelvic floor muscle contraction, the vaginal pressure (muscle force) to feel the fingers of the examiner, the vertical displacement of the fingers of the examiner and duration of contraction. Each muscle contraction dimension is rated on a 4-point ordinal scale. The pressure felt by examining fingers is rated 1 = no response, 2 = weak squeeze, 3 =

moderate squeeze, or 4 = strong squeeze. The vertical displacement is rated 1 = none, 2 = finger base moves anteriorly, 3 = whole length of fingers move anteriorly, or 4 = whole fingers move anteriorly, are gripped and pulled in. Duration of contraction (in seconds) is timed and scored as follows: 1 = none, 2 = less than 1 second, 3= 1–3seconds, or 4 = more than3 seconds. Rating was summed to obtain total score with a possible range of score of (3-12). The lowest score was (3-6) and the moderate score was (7-9), while the highest was (10-12).

Tool IV: The king's health questionnaire (KHQ):

It was developed by Dr. C. J. Kelleher **et al (**1997**)** [39] in the United Kingdom to assess the impact of UI and other lower urinary tract symptoms on the health-related quality of life of women**.** The questionnaire consists of three parts with 30 questions distributed in nine domains. The first part contains two domains measuring general health (consists of one question and graded as very good, good, fair, poor and very poor) and incontinence impact (consists of one question and rated as not at all, a little, moderate and a lot). The second part includes 18 questions divided into seven domains of quality of life: role limitations (consists of two questions and rated as not at all, a little, moderate and a lot), physical limitations (consists of two questions and rated as not at all, a little, moderate and a lot), social limitations (consists of two questions and rated as not at all, a little, moderate and a lot), personal relationships (consists of three questions and rated as not applicable, not at all, a little, moderate and a lot), emotions (consists of three questions and rated as not at all, a little, moderate and very much), sleep and energy (consists of three questions and rated as never, sometimes, often and all the time), and coping measures (consists of four questions and rated as never, sometimes, often and all the time). The third part is considered as a single domain (Symptom severity scale) which comprises 10 questions in relation to frequency, nocturia, urgency, urge, stress, intercourse incontinence, nocturnal enuresis, infections, pain, and difficulty in voiding. These 10 questions rated as nil, mild, moderate and severe. Numerical values are assigned to all answers, added and evaluated by domain. The KHQ is scored in each of its domains. The nine domains scored between 0 (best) and 100 (worst). The domain of Symptom Severity scale is scored from 0 (best) to 30 (worst). The total score of KHQ is the sum scores of all domains. Decreases in KHQ domain scores indicate an improvement in quality of life. The minimally important difference - the smallest change in score that subjects perceive as beneficial is 3 points for the symptom severity scale and 5 points for all other KHQ domains. [40] It is interesting to note that lower scores indicate patient wellbeing and higher scores mean that the person is severely affected by the disease condition. The questionnaire was originally standardized to be self administered, but it was applied during an interview and questions were read by the researchers as written.

METHODS

The study was accomplished according to the following steps:

1. Approval:

An official letter clarifying the purpose of the study was obtained from the Faculty of Nursing, Damanhour University and forwarded to the concerned personnel at National Medical Institution in Damanhour, Albehera Governorate, to take their permission to collect data.

2. Tools:

- Tool (I) was developed by the researchers after extensive review of recent and relevant literature.
- Tools (II and IV) were adopted then translated into Arabic language by specialist in English language translation. The version was revised and then back translated into English by another translator. The translation was refined after back translation until agreement was obtained among the two translators. The tools reliability was tested by test- retest method within two weeks interval on 8 women, where cronbach's alpha test was 0.87 & 0.82 respectively.
- Tool (III) was adopted and its reliability was assured by interrater method the association between the two rater ratings of percentage was estimated using Pearson's correlation. This association was high, where r = 0.95 & p = 0.001.
- The content validity of tools was tested by a jury of 7 experts in the fields of obstetric and gynecologic nursing as well as medical surgical nursing.

3. Pilot study:

A pilot study was conducted on randomly selected 8 menopausal women with urinary incontinence not included in the actual study, to assess the clarity and applicability of the tools, and to identify any difficulties that may be faced during the actual study. In addition, the time needed to complete the tools was also estimated. The tools proved to be clear and no modification was needed.

4. Booklet preparation:

The researchers reviewed the relevant literature then developed a booklet. It entails information about anatomy and function of the pelvic floor muscles, definition of UI, factors improve muscle strength, definition and benefits of kegel's exercise and how to perform kegel's exercise. It contains illustrative pictures. Simple language and attractive presentation were considered during the preparation. The booklet was then reviewed by jury of 7 experts in the obstetric and gynecologic nursing as well as medical surgical nursing. After that the needed modifications were done. 40 booklets were printed and given to each woman in study group at the end of training session before the beginning of the study.

5. Collection of data:

- Collection of data consumed 12 months (from the beginning of June 2018 to the end of June 2019).

- Each woman in the study and control groups was interviewed by the researchers individually and in total privacy to assure confidentiality of information and its utilization only for the purpose of the research. The researchers introduced themselves to the woman, and explained the purpose of the study, then oral consent was obtained for participation in the study. During this interview tool I was collected from the woman. Also pre-assessment was done using tool (II) for both groups to assess the severity of the urinary incontinence by asking the women to complete the PRAFAB- questionnaire. After that tool (IV) was used for both groups to assess their quality of life by asking the women to complete the king's health questionnaire.

- The pre-assessment of pelvic floor muscles strength was done for both groups using tool (III) the Brink scale by obstetric researchers. Where the woman was asked to lie down on the bed in the dorsal lithotomy position and completely relax the perineal area. The researcher's gloved index and middle fingers were lubricated and gently introduced 4-6 cm into the vaginal canal with the palm facing down to assess a lateral or a perceived right to left muscle contraction. Women were told that after a count of 3, they would be instructed to contract their pelvic muscles just like when they hold the urine ,and hold the contraction for as long as possible. The researcher fingers were then rotated 90^{o} counter clockwise to assume a vertical position with the index finger resting on top of the middle finger. The women were again instructed, after a count of 3 and on command, to contract around the researcher fingers, thus enabling the researcher to assess the anteroposterior or top to bottom contraction. In those women with vaginal stenosis, the index or middle finger was used to determine muscle strength. When women contracted their muscles correctly, the researchers noted the pressure and vertical displacement measurements by Brink scale criteria, muscle contraction duration was evaluated. The researchers noted the contraction time with a stopwatch. A grade according to the tool was given. Women were grouped based on their Brink score into lowest score (3-6), moderate score (7-9) and highest score (10-12).

- The control group was left for routine hospital management.

- Training session for the study group about the Kegel's exercise by interviewing each woman for 20-30 minutes individually and privately. The session include information about anatomy and function of the pelvic floor muscles, definition of UI, factors improve muscle strength, definition and benefits of kegel's exercise and how to perform kegel's exercise. This information present in previously prepared booklet.

- During the training session each woman in the study group was taught to perform Kegel's exercise as follows:

- Ask each woman to choose a comfortable position. As Kegel's exercises can be performed when sitting, standing and laying. It is recommended that the woman exercise in each position every day

- Instruct each woman to empty her bladder and practices warming exercises once. Then tightens her pelvic floor muscles under the bladder as hard as she can (as her control the pass of urine), holds for count of 6 and relaxes for 6 seconds. Each contraction cycle should last 12 seconds or 5 contractions a minute. She should repeat this exercise for 5

minute (25 contractions) 3 times a day in the first week and she should eventually build up to 20 minutes (100 contractions) 3 times a day at the end of week 12. Instruct the woman to make Kegel's exercise part of daily routine. Kegel's exercise (pelvic floor muscle exercise) was used for 3 consecutive months. They were asked to repeat the exercise to ascertain that they have understood the proper way of performing it. At the end of each educational session, the Arabic booklet was handed to the woman.

- The Kegel's exercise supervision and follow up of women in the study group was implemented by weekly telephone communication. Monthly meetings with the participating women were held for follow up, and refreshing information. The women were requested to come for follow up after 4 weeks, 8 weeks and 12 weeks at obstetric and gynecological outpatient clinic or Urological outpatient clinic to encourage women to do Kegel's exercise regularly and increased their compliance. Also, the women were asked to show how they were performing the Kegel's exercises. During follow up visits they were instructed to increase the number of exercise gradually according to individual woman's ability.

- The control group was also followed up after 4 weeks, 8 weeks and 12 weeks at obstetric and gynecological outpatient clinic or Urological outpatient clinic.

- During follow up of 12 weeks post-assessment of severity of the urinary incontinence, pelvic floor muscle strength, and quality of life for both the study and control groups using tools (II, III & IV) were performed.

Ethical Consideration:

Each woman in both groups was interviewed alone in complete privacy to explain the purpose of the study, take her oral informed consent to participate. The confidentiality and anonymity of individual responses, volunteer participation and right to refuse participating in the study were emphasized to the women. Also ensure her right to withdraw from the study at any time without any consequences.

Statistical Analysis:

After collection of data, statistical analysis was done using Statistical Package for Social Sciences (SPSS) version 20. Descriptive and analytical statistics were used such as percentages, means and standard deviations. Chi-square-test, Fisher Exact-test, and T-test with a P value was set at .05 to identify statistical significance difference between the results.

III. RESULTS

According to **table 1** it was noted that a sizeable proportion of the study and the control groups (70% & 65% respectively) aged from 55 to 60 years with mean age 56.575±4.272 and 55.875±3.090 for study and control groups respectively. Also 55% & 40% of them respectively had secondary education. More than one-half (55% and 65%) of both groups respectively were housewife. More than one-half (55.6%) of the study group had professional work, while 42.9 % of the control group were employee. And more than one-half (50% and 55%) of the study and control groups respectively were from rural areas. The table also indicates that the two groups had relatively similar socio-demographic characteristics, therefore, no statistically significant difference was found between them.

Table 2 clarifies that both the study and the control groups were exactly similar pertaining to the number of gravidity and parity, where the vast majority of the study and control groups (90% and 95% respectively) were multigravida and multipara. Mean age of youngest child was 18.300±3.702 and 19.350±3.807 in the study and control groups respectively. Three-fifths (60%) of the study group had normal vaginal delivery, compared to less than one-half (45%) of the control group. It can be observed that a sizeable proportion of the study and the control groups (70% and 60% respectively) were free from any problems associated with the childbirths. No statistically significant difference was detected between the two groups' reproductive history.

Table 3 display number and percentage distribution of the study subjects according to their severity of urinary incontinence before and after twelve weeks of intervention, as regards to protection before intervention, it was observed that (50% and 40 %) of the study and control groups respectively were sometimes use protection, or had to change underwear because of urine loss. After twelve weeks of intervention, it was decreased from 50% to 20% among the study group, while it remained the same (40%) among the control group. Regarding the amount of urine loss, before intervention (30% & 40%) of the study and control groups respectively had loss of urine so much that it wets their

protection or cloths. after twelve weeks of intervention; it decreased from 30% to 10% among the study group, while it remained the same (40%) among the control group. Concerning, frequency of involuntary loss of urine before intervention (55% and 45%) in the study and control groups respectively had more than once but less than three times a week. after twelve weeks of intervention, it decreased dramatically from 55% to 5 % among the study group, while it remained the same (45%) among the control group. Adjustment for implications of urine loss before intervention 35% and 25% of the study and control groups respectively had stopped most physical activities that caused involuntary loss of urine. After twelve weeks of intervention, it was decreased from 35% to 5% in the study group while, it increased from 25% to 70% among the control group. In relation to body image, before intervention (45% and 30%) of the study and control groups respectively were thinks urine loss is annoying and troublesome. After twelve weeks of intervention it decreased from 45% to 10% in the study group while, it increased from 30% to 45% among the control group. Finally, the table clearly illustrates a statistically significant difference regarding the total score of urinary incontinence severity before intervention and after twelve weeks among the study group (P = .000). Where, severe urinary incontinence was observed among 45% of them before the intervention then after twelve weeks of intervention it decreased to 5%. Also a statistically significant difference between both groups was found after twelve weeks of intervention (P=0.000), where 60 % of the control group had severe total score, compared to only 5% of the study group.

Table 4 exhibits total mean scores of UI severity among the study and control groups before and after twelve weeks of intervention, where mean ± SD were relatively similar (13.200± 2.594 and 13.250± 2.284) in the study and control groups respectively before intervention. After twelve weeks of intervention, the mean ± SD were decreased in the study group (5.100± 2.600), compared to (12.6250± 2.529) in the control group. There was statistically significant difference between the study and control groups p= (0.0001). The difference between the means UI severity score among the study group before and after twelve weeks of intervention was statistically `significant (p = .000). Whereas the same difference among the control group was not statistically significant (p =0.250).

Table 1: Number and percentage distribution of study subjects according to their socio-demographic-characteristics

Socio-demographic data	Study Group (40)		Control Group (40)		FET/χ^2 (P) T test (P)
	No	%	No	%	
Age (years):					0.228 (0.633)
- 50-	12	30.0	14	35.0	
- 55-60	28	70.0	26	65.0	
Mean & SD	56.575±4.272		55.875±3.090		0.840 (0.404)
Level of education:					5.129 (0.163)
- read & write	2	05.0	8	20.0	
- Basic	6	15.0	4	10.0	
- Secondary	22	55.0	16	40.0	
- University or more	10	25.0	12	30.0	
Occupation:					0.833(0.361)
- Housewife	22	55.0	26	65.0	
- Working	18	45.0	14	35.0	
Type of work:	**n=18**		**n=14**		5.283(0.145)
- Professional	10	55.6	3	21.4	
- Employee	2	11.1	5	35.7	
- worker	6	33.3	6	42.9	
Residence:					0.201(0.654)
- Urban	20	50.0	18	45.0	
- Rural	20	50.0	22	55.0	

□□^{2}(P): Chi-Square Test &P for□□^{2}Test FET (P): Fisher Exact Test & P for FET-Test *: Significant at P ≤0.05

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Table (2): Number and percentage distribution of the study subjects according to their reproductive history

Variables	Study Group (40)		Control Group (40)		FET/χ^2 (P) T test (P)
	No	%	No	%	
Gravidity:					4.867 (0.713)
- Primigravida	4	10.0	2	05.0	
- Multigravida	36	90.0	38	95.0	
Mean & SD	4.050±2.287		3.800±2.127		0.506(0.614)
Parity:					5.298(0.539)
- Primipara	4	10.0	2	05.0	
- Multipara	36	90.0	38	95.0	
Mean & SD	2.900±1.277		3.050±1.484		0.485(0.629)
Age of youngest child:					1.586 (0.452)
- < 15	4	10.0	2	05.0	
- 15-20	20	50.0	17	42.5	
- 20 or more	16	40.0	21	52.5	
Mean & SD	18.300±3.702		19.350±3.807		1.251(0.215)
Mode of last delivery:					2.242 (0.328)
- Normal vaginal	24	60.0	18	45.0	
- C.S.	10	25.0	16	40.0	
- Assisted	6	15.0	6	15.0	
Problems associated with delivery:	8	20.0	4	10.0	6.593 (0.077)
- Difficult labor	0	00.0	4	10.0	
- Episiotomy	4	10.0	8	20.0	
- Perineal tear	28	70.0	24	60.0	
- None					

□□^{2}(P): Chi-Square Test &P for□□^{2}Test FET (P): Fisher Exact Test & P for FET-Test *: Significant at P ≤0.05

Table (3): Number and percentage distribution of the study subjects according to their degree of UI severity before and after twelve weeks of intervention (PRAFAB scale)

Degree of SUI (PRAFAB scale)	Study group = 40				Control group= 40				FET/χ2 (P) Before	FET/χ2 (P) After
	Before intervention		After intervention		Before intervention		After intervention			
	No.	%	No.	%	No.	%	No.	%		
Protection:										
• I never use protection for urine loss	0	00.0	30	75.0	0	00.0	0	00.0		
• I sometimes use protection, or I have to change my underwear because of urine loss	20	50.0	8	20.0	16	40.0	16	40.0	1.444 (0.486)	60.133 (0.000) *
• I normally use protection, or change my underwear several times a day because of urine loss	6	15.0	2	05.0	10	25.0	20	50.0		
• I always have to use protection because of urinary incontinence	14	35.0	0	00.0	14	35.0	4	10.0		

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Amount:										
• The amount of urine loss is just a drop or less	2	05.0	12	30.0	4	10.0	0	00.0	3.343 (0.342)	43.090 (0.000) *
• Sometimes I loose a trickle	20	50.0	24	60.0	18	45.0	10	25.0		
• The loss of urine is so much that it wets my protection orclothes noticeably	12	30.0	4	10.0	16	40.0	16	40.0		
• The loss of urine is so much that my protection is soaked or leaks	6	15.0	0	00.0	2	05.0	14	35.0		
Frequency:										
Involuntary loss of urine occurs:										
• Once a week or less	10	25.0	36	90.0	12	30.0	2	05.0	0.868 (0.833)	63.909 (0.000) *
• More than once but less than three times a week	22	55.0	2	05.0	18	45.0	18	45.0		
• More than three times a week, but not every day	6	15.0	2	05.0	8	20.0	18	45.0		
• Every day	2	05.0	0	00.0	2	05.0	2	05.0		
Adjustment:										
Implications of urine loss:										
• I am not hampered in my daily activities	8	20.0	2	05.0	4	10.0	0	00.0	7.333 (0.062)`	58.133 (0.000) *
• I have stopped some activities, such as some sports and physically demanding activities	16	40.0	36	90.0	16	40.0	4	10.0		
• I have stopped most physical activities that caused involuntary loss of urine	14	35.0	2	05.0	10	25.0	28	70.0		
• I almost never go out	2	05.0	0	00.0	10	25.0	8	20.0		
Body image:										
• I am not bothered by my urine loss	0	00.0	34	85.0	2	05.0	0	00.0	4.906 (0.152)	68.851 (0.000) *
• I think urine loss is annoying and troublesome, but I am not greatly bothered by it	18	45.0	4	10.0	12	30.0	18	45.0		
• Urine loss makes me feel dirty	16	40.0	2	05.0	14	35.0	16	40.0		
• I am disgusted by myself because of my urinary incontinence	6	15.0	0	00.0	12	30.0	6	15.0		
Total PRAFAB scale:										
- Not severe (< 14)	22	55.0	38	95.0	24	60.0	16	40.0	0.205 (0.651)	27.578 (0.000) *
- Severe (≥14)	18	45.0	2	05.0	16	40.0	24	60.0		
FET/χ^2 (P)	17.067(0.000) *				3.2(0.074)					

□□^{2}(P): Chi-Square Test &P for□□^{2}Test FET (P): Fisher Exact Test & P for FET-Test *: Significant at P ≤0.05

Table (4): total mean scores of UI severity among the study and control groups before and after twelve weeks of intervention (PRAFAB scale)

Mean total score of UI severity	Study Group (n=40)	Control Group (n=40)	T test (P)
	Mean + SD	Mean + SD	
Before intervention	13.200± 2.594	13.250± 2.284	0.091 (0.927)
After intervention	5.100± 2.600	12.6250± 2.529	13.123(0.000) *
T test (P)	13.949(0.0001) *	1.160(0.250)	

T (P): T-test & P for T-test *: Significant at P ≤0.05

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Table (5): Number and percentage distribution of the study subjects according to their pelvic floor muscles strength before and after twelve weeks of intervention (Brink scale)

Pelvic floor muscles strength	Study group = 40				Control group= 40				FET/χ2 (P) Before	FET/χ2 (P) After
	Before intervention		After intervention		Before intervention		After intervention			
	No.	%	No.	%	No.	%	No.	%		
Vaginal pressure or muscle force:										
- No squeeze	4	10.0	0	00.0	2	05.0	2	05.0	0.794 (0.676)	22.397 (0.000) *
- Weak squeeze	20	50.0	7	17.5	20	50.0	14	35.0		
- Moderate squeeze	16	40.0	18	45.0	18	45.0	24	60.0		
- Strong squeeze	0	00.0	15	37.5	0	00.0	0	00.0		
FET/χ^2 (P)	25.377(0.000) *				1.916(0.590)					
vertical displacement:										
- None	3	07.5	0	00.0	2	05.0	1	02.5	0.419 (0.845)	34.369 (0.000) *
- finger base moves anteriorly	20	50.0	4	10.0	20	50.0	17	42.5		
- whole length of fingers move anteriorly	17	42.5	16	40.0	18	45.0	22	55.0		
- whole fingers move anteriorly, are gripped and pulled in	0	00.0	20	50.0	0	00.0	0	00.0		
FET/χ2 (P)	33.697(0.000) *				0.977(0.807)					
Duration of contraction (in seconds):										
- None	4	10.0	0	00.0	2	05.0	0	00.0	0.732 (0.697)	16.798 (0.000) *
- Less than 1 second	19	47.5	8	20.0	20	50.0	20	50.0		
- 3 seconds	17	42.5	12	30.0	18	45.0	16	40.0		
- More than3 seconds	0	00.0	20	50.0	0	00.0	4	10.0		
FET/χ2 (P)	29.344(0.000) *				6.118(0.106)					
Total Score of pelvic floor muscles strength:										
- Low (3-6)	16	40.0	4	10.0	19	47.5	14	35.0	0.457 (0.499)	31.588 (0.000) *
- Moderate (7-9)	24	60.0	8	20.0	21	52.5	22	55.0		
- High (10-12)	0	00.0	28	70.0	0	00.0	4	10.0		
FET/χ2 (P)	43.2(0.000) *				4.781(0.092)					

□□^{2}(P): Chi-Square Test &P for□□^{2}Test FET (P): Fisher Exact Test & P for FET-Test *: Significant at P ≤0.05

Table 5 displays the distribution of the study subjects according to their pelvic floor muscles strength before and after twelve weeks of intervention (Brink scale). Regarding vaginal pressure or muscle force, before intervention strong squeeze of pelvic floor muscle strength was not observed (0%) among any of the study or control groups with no statistical significant difference between them P= (0.676). After twelve weeks of intervention it was revealed that strong squeeze increased from 0% to 37.5% in the study group, while it remained unchanged (0%) in the control group. As for vertical displacement before intervention 50 % of both groups were having finger base moves anteriorly. After twelve weeks of intervention improvement was found in the study group where 50% of the subjects were having whole fingers move anteriorly, are gripped and pulled in, while it remained unchanged (0%) in the control group. Regarding duration of contraction in second, before intervention it was obvious that contraction more than 3 seconds was not observed (0%) a among both the study or control groups, after twelve weeks of intervention it was increased from 0 % to 50 % in the study group compared to, minimal increased from 0% to 10% in the control group. About total score of pelvic floor muscles strength, moderate level was representing the highest percentage (60 % and 52 %) in the study and control groups respectively before intervention and high level was not observed (0%) among any of the study or control groups, after twelve weeks of intervention high level increased to more than two- third (70%) in the study group compared to, only one- tenth (10%) in the control group. A highly statistically significantly differences were observed between the study and control groups after twelve weeks of intervention in relation to all parameters of pelvic floor muscles strength (Brink

scale) and total score of pelvic floor muscles strength, where P = 0.000. At the same time there was a statistically significant improvement regarding the same parameters before and after twelve weeks of intervention among study group (p = .000).

Table 6 illustrates total mean scores of pelvic floor muscles strength of the study and control groups before intervention and after twelve weeks of intervention. The total mean score of the pelvic floor muscle strength was almost equal (7.075±1.366 and 7.225±1.577) among both the study and control groups respectively before intervention with no statistically significant difference p = 0.651. After twelve weeks of intervention, the total mean score increased to 9.900±1.707 in the study group while, in the control group it was almost equal as before intervention 7.675±1.509. Consequently, the difference between the two groups were found to be statistically significant (P=0.000). Also the difference between the total means score of the pelvic floor muscle strength within the study group before and after twelve weeks of intervention was statistically significant (p =0.0001). Whereas the same difference among the control group was not statistically significant (p = 0.196).

Table (6): Total mean scores of pelvic floor muscles strength among the study and control groups before and after twelve weeks of intervention (Brink scale)

Total mean score of pelvic floor muscles strength	Study Group (n=40) Mean + SD	Control Group (n=40) Mean + SD	T test (P)
Before intervention	7.075±1.366	7.225±1.577	0.455(0.651)
After intervention	9.900±1.707	7.675±1.509	6.178(0.000) *
T test (P)	8.172(0.0001) *	1.304(0.196)	

T (P): T-test & P for T-test *: Significant at P ≤0.05

Table 7 explains quality of life mean scores of the study and control groups before intervention and after twelve weeks of intervention. Regarding general health negative perception, it was an almost the same before intervention and after twelve weeks of intervention in the control group (55.783±19.071 and 54.375±16.878) respectively. While, in the study group it was 53.750±18.389 before intervention and after twelve weeks of intervention there was remarkable decrease in mean± SD (15.000±12.404). As for incontinence impact, mean scores before intervention were 54.948±17.772 and 55.783±19.071 in the study and control groups respectively. After twelve weeks of intervention mean score reduced to 14.985±16.778 in the study group, while it remained almost the same in the control group 54.948±17.772. Regarding role limitations, before intervention means scores were (37.470±22.567 and 40.800±25.861) among the study and control groups respectively. After twelve weeks of intervention, it was decreased to 7.475±9.924 in the study group while, it remained nearly the same 39.958±18.798 in the control group. Regarding physical limitations, it were sharply decreased in the study group from 54.970±28.799 to 9.140±11.268 before intervention and after twelve weeks of intervention respectively, compared to minimal decreased in the control group (53.295±19.684 and 50.785±22.313) respectively. Regarding social limitations, there was observable improvement after twelve weeks of intervention in the study group where mean score was 2.495±5.167 compared to 27.200±26.010 before intervention while, in the control group means scores were almost the same (34.975±24.394 and 34.835±20.930) before and after twelve weeks of intervention. As for personal relationships, remarkable improvement in the study group from 20.810±24.943 to 4.155±9.031 before and after twelve weeks of intervention consecutively compared to, very little decrease was observed in the control group before intervention and after twelve weeks of intervention (14.980±15.907 and 14.565±16.080) respectively. About emotions, before intervention mean scores were (31.635±21.993 and 36.080±22.742) in the study and control groups respectively. While, after twelve weeks of intervention it remarkable decreased in the study group to 4.995±6.627 compared to, minimally decreased in mean score in the control group to 35.750±23.843. Regarding mean score of sleep/ energy dimension before intervention, it was (56.640±24.700 and 51.640±21.950) among the study and control groups respectively, after twelve weeks of intervention, mean score reduced in the study group to (14.955±10.526) , while it declined slightly to (50.815±19.599) in the control group. Regarding coping measures and symptom severity the control group had almost equal mean ±SD before intervention and after twelve weeks of intervention, where 52.890±21.064 and 51.640±20.258 respectively for coping measures, also 13.300±3.140 & 13.000±3.909 respectively for symptom severity. In contrast, the study group had observable reduction in mean ±SD after twelve weeks of intervention comparing to before intervention, where 10.800±9.267 and 49.765±27.307 respectively for coping measures, also 2.650±2.403 and 12.700±3.844 respectively for symptom severity. Finally the total mean scores of QOL was almost the same before intervention (393.84±128.983 and 386.555±139.888) among the study and control groups respectively, while it improved

much more (87.585±77.054) among the study group than the control group (379.305±135.371) after twelve weeks of intervention. a statistically significant differences were found regarding all domains of quality of life as presented by the perception of health, impact of the incontinence, role limitations, physical limitations, social limitations, personal relationships, emotions, sleep/ energy, coping measures and symptom severity before and after twelve weeks of intervention among the study group where (P = 0.000). However, the differences between the study and the control groups after twelve weeks of intervention were statistically highly significant in relation to same domains of quality of life, where P = 0.000. On the contrary, in relation to the control group, the table also reveals that, no significant change was observed within the control group in relation to the same domains of quality of life.

Table (7): Quality of life mean scores of the study and control groups before and after twelve weeks of intervention

Mean score of QOL	Study Group (n=40) Mean + SD	Control Group (n=40) Mean + SD	T test (P)
General health perception:			
- Before intervention	53.750± 18.389	55.000± 15.191	0.331(0.741)
- After intervention	15.000± 12.404	54.375± 16.878	11.890(0.000)
T test (P)	11.049(0.000)	0.174(0.862)	
Incontinence impact:			
- Before intervention	54.948± 17.772	55.783± 19.071	0.203(0.840)
- After intervention	14.985± 16.778	54.948± 17.772	10.341(0.000)
T test (P)	10.341(0.000)	0.203(0.840)	
Role limitations:			
- Before intervention	37.470±22.567	40.800±25.861	0.614(0.541)
- After intervention	7.475±9.924	39.958±18.798	9.665(0.000) *
T test (P)	7.695(0.000) *	0.1666(0.868)	
Physical limitations:			
- Before intervention	54.970±28.799	53.295±19.684	0.304(0.762)
- After intervention	9.140±11.268	50.785±22.313	10.537(0.000) *
T test (P)	9.373(0.000) *	0.534(0.595)	
Social limitations:			
- Before intervention	27.200±26.010	34.975±24.394	1.379(0.172)
- After intervention	2.495±5.167	34.835±20.930	9.488(0.000) *
T test (P)	5.892(0.000) *	0.028(0.978)	
Personal relationships:			
- Before intervention	20.810±24.943	14.980±15.907	1.246(0.216)
- After intervention	4.155±9.031	14.565±16.080	3.570(0.001) *
T test (P)	3.971(0.0002) *	0.116(0.908)	
Emotions:			
- Before intervention	31.635±21.993	36.080±22.742	0.889(0.377)
- After intervention	4.995±6.627	35.750±23.843	7.860(0.000) *
T test (P)	7.335(0.000) *	0.0633(0.9497)	
Sleep/energy:			
- Before intervention	56.640±24.700	51.640±21.950	0.957(0.342)
- After intervention	14.955±10.526	50.815±19.599	10.195(0.000) *
T test (P)	9.819(0.000) *	0.177(0.860)	
Coping measures:			
- Before intervention	49.765±27.307	52.890±21.064	0.573(0.568)
- After intervention	10.800±9.267	51.640±20.258	11.595(0.000) *
T test (P)	8.546(0.000) *	0.271(0.788)	
Symptom severity:			
- Before intervention	12.700±3.844	13.300±3.140	0.765(0.447)
- After intervention	2.650±2.403	13.000±3.909	14.266(0.000) *
T test (P)	14.021(0.000) *	0.378(0.706)	
Total score of QOL:			
- Before intervention	393.84±128.983	386.555±139.888	0.242(0.809)
- After intervention	87.585±77.054	379.305±135.371	11.845(0.000) *
T test (P)	12.892(0.000) *	0.236(0.814)	

T (P): T-test & P for T-test *: Significant at P ≤0.05

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Table 8 clarifies number and percentage distribution of the study and control groups according to their UI symptoms before and after twelve weeks of intervention. Regarding increased urinary frequency after twelve weeks of intervention, a sizeable proportion (60%) of the study group had none increased urinary frequency, compared to only 5% of the control group. As for nocturia after twelve weeks of intervention, 45% of the study group had none nocturia, compared to only 10% of the control group. Regarding urgency after twelve weeks of intervention, 65% of the study group had none urgency, compared to only 10% of the control group. About urge incontinence and Stress incontinence, 65% & 55% were haven't urge incontinence and Stress incontinence respectively in the study group, compared to only 10% of the control group. In addition, bladder pain after twelve weeks of intervention, all the study group (100%) experienced no bladder pain, compared to the majority of the control groups (85 %). Post void dribble symptom, the majority of the study group (90 %) had none post void dribble, compared to (77.5 %) of the control group. The total score of urinary incontinence symptoms was moderate in a sizeable proportion (60% and 77.5%) in both the study and control groups respectively before intervention with no statistically significant difference. After twelve weeks of intervention it became mild in more than two-thirds (70%) in the study group while, it was almost equal (75.5%) in the control group. A statistical significant difference was found between the study and control groups after twelve weeks of intervention in relation to increased urinary frequency, nocturia, urgency, urge incontinence, stress incontinence and total score UI symptoms where p= (0.000) also in relation to bladder pain and post void dribble where p=(0.039 and 0.017 respectively). No statistical significant differences were found between the study and control groups before intervention and after twelve weeks of intervention in relation to nocturnal, intercourse incontinence and waterworks infections

Table (8): Number and percentage distribution of the study and control groups according to their UI symptoms before and after twelve weeks of intervention

Urinary incontinence symptoms	Study group = 40				Control group= 40				FET/χ2 (P) Before	FET/χ2 (P) After
	Before intervention		After intervention		Before intervention		After intervention			
	No.	%	No.	%	No.	%	No.	%		
Increased urinary frequency										
- None	0	00.0	24	60.0	2	05.0	2	05.0		
- Mild	4	10.0	12	30.0	8	20.0	8	20.0	3.487	57.242
- Moderate	10	25.0	4	10.0	8	20.0	2	05.0	(0.274)	(0.000)
- Severe	26	65.0	0	00.0	22	55.0	28	70.0		
Nocturia										
- None	0	00.0	18	45.0	2	05.0	4	10.0		
- Mild	2	05.0	20	50.0	2	05.0	0	00.0	2.411	73.064
- Moderate	4	10.0	2	05.0	2	05.0	6	15.0	(0.446)	(0.000)
- Severe	34	85.0	0	00.0	34	85.0	30	75.0		
Urgency										
- None	8	20.0	26	65.0	4	10.0	4	10.0		
- Mild	4	10.0	12	30.0	0	00.0	0	00.0	6.254	59.276
- Moderate	6	15.0	2	05.0	6	15.0	12	30.0	(0.087)	(0.000)
- Severe	22	55.0	0	00.0	30	75.0	24	60.0		
Urge incontinence										
- None	4	10.0	26	65.0	4	10.0	4	10.0		
- Mild	4	10.0	12	30.0	2	05.0	0	00.0	5.002	70.623
- Moderate	4	10.0	2	05.0	0	00.0	6	15.0	(0.155)	(0.000)
- Severe	28	70.0	0	00.0	34	85.0	30	75.0		
Stress incontinence										
- None	2	05.0	22	55.0	4	10.0	4	10.0		
- Mild	4	10.0	16	40.0	6	15.0	10	25.0	1.368	40.639
- Moderate	12	30.0	2	05.0	10	25.0	6	15.0	(0.719)	(0.000)
- Severe	22	55.0	0	00.0	20	50.0	20	50.0		
Nocturnal										
- None	34	85.0	38	95.0	34	85.0	36	90.0		
- Mild	4	10.0	2	05.0	4	10.0	0	00.0	3.319	4.937
- Moderate	2	05.0	0	00.0	0	00.0	2	05.0	(0.216)	(0.109)
- Severe	0	00.0	0	00.0	2	05.0	2	05.0		
Intercourse incontinence										
- None	36	90.0	40	100.0	34	85.0	36	90.0		

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- Mild	0	00.0	0	00.0	2	05.0	0	00.0	3.971	3.464
- Moderate	4	10.0	0	00.0	2	05.0	2	05.0	(0.193)	(0.122)
- Severe	0	00.0	0	00.0	2	05.0	2	05.0		
Waterworks infections										
- None	36	90.0	38	95.0	38	95.0	38	95.0		
- Mild	0	00.0	2	05.0	0	00.0	0	00.0	1.805	3.256
- Moderate	2	05.0	0	00.0	2	05.0	2	05.0	(0.358)	(0.135)
- Severe	2	05.0	0	00.0	0	00.0	0	00.0		
Bladder pain										
- None	32	80.0	40	100.0	34	85.0	34	85.0		
- Mild	0	00.0	0	00.0	0	00.0	0	00.0	0.599	5.816
- Moderate	2	05.0	0	00.0	2	05.0	2	05.0	(0.794)	(0.039)
- Severe	6	15.0	0	00.0	4	10.0	4	10.0		
Post void dribble										
- None	29	72.5	36	90.0	30	75.0	31	77.5		
- Mild	4	10.0	4	10.0	2	05.0	1	02.5	1.491	9.435
- Moderate	2	05.0	0	00.0	4	10.0	4	10.0	(0.691)	(0.017)
- Severe	5	12.5	0	00.0	4	10.0	4	10.0		
Total score UI symptoms:										
- Mild	10	25.0	28	70.0	5	12.5	8	20.0	2.958	20.825
- Moderate	24	60.0	12	30.0	31	77.5	30	75.0	(0.228)	(0.000)
- Severe	6	15.0	0	00.0	4	10.0	2	05.0		

□□^{2}(P): Chi-Square Test &P for□□^{2}Test FET (P): Fisher Exact Test & P for FET-Test *: Significant at P ≤0.05

IV. DISCUSSION

Urinary incontinence is a complex and serious condition that can affect menopausal women. It is not only a serious medical condition but also an undeniable psychosocial problem creating embarrassment and negative self-perception, and it has a severe impact on a woman's quality of life. [41, 42] Early detection of the UI and appropriately selected pharmacological and non-pharmacological treatment, including Kegel's exercise, play a fundamental role in improving the quality of life of menopausal women, and also prevent exacerbation of symptoms. [43]

The present study revealed that the severity of urinary incontinence had decreased after performing Kegel's exercise for twelve weeks among the study group (P =0.000). Meanwhile, such a decrease was not observed among the control group after received routine hospital care (P = 0.074). This result suggests a possible positive effect of Kegel's exercise on treating the urinary incontinence among menopausal women. This result may be attributed to the fact that urethral closure is maintained by an adequate support provided by the endopelvic fascia and the tonic contraction of the levator ani muscles. When properly carried out, Kegel's exercise restores the ability to contract these muscles in a timed and coordinated way and thus improves or restores continence. [44] Kegel's exercise treats urinary incontinence symptoms by reinforcing weakened pelvic floor muscle and improving elasticity. It also improves the tone and function of the pelvic floor muscles. [45]

The result of the present study is in line with at least seven studies. *First*, Dumoulin et al (2018) [46] who conducted a review about "Pelvic floor muscle training versus no treatment, or inactive control treatments, for urinary incontinence in women". They concluded that PFMT can cure or improve symptoms of SUI and all other types of UI. It may reduce the number of leakage episodes, the quantity of leakage. They also suggested that PFMT could be included in first-line conservative management programmes for women with UI. *Second*, Sankarganesh et al (2018) [47] who concluded that pelvic floor exercise therapy significantly improves the pelvic floor muscle function in subjects with urinary incontinence in women. *Third*, Gadhavi (2017) [48 who concluded that tanzberger exercise and kegel's exercise both were effective with improving pelvic floor muscle strength and reducing score of revised urinary incontinence scale in women with stress incontinence, but none intervention is better than other. *Fourth*, Lee et al (2017) [49] who studied "the effects of pelvic floor muscle exercise on urinary incontinence in elderly women with cognitive impairment". They found that a significant reduction in the number of UI and micturition episodes was observed in the study group and a significant improvement in the subjective symptoms evaluated by the ICIQ-SF was noted after 12 weeks of PFME. *Fifth*, Nie et al (2017) [50] who done a meta-analysis about pelvic floor muscle training for the treatment of urinary incontinence. They concluded that regular PFMT relieved UI symptoms, strengthened PFM, and improved the quality of life of women with UI in this meta-analysis. *Sixth*, Ndreu et al (2015) [51] who studied "pelvic floor muscle training versus no treatment for urinary

incontinence in women". They reported that the study group had improvement in the IU situation after 3 months of applying the PFME. Where, this group had decreased the frequency, quantity of urine and number of used protectors, p ** <0.001. *Seventh*, Weber-Rajek et al (2015) [52] who concluded that Kegel's muscle exercises are an effective method of treating various forms of urinary incontinence in postmenopausal women.

The result of the current study is also similar to the results of Park and Kang (2014) [53] who concluded that Kegel's exercises are effective and better than no treatment in the management of women with stress urinary incontinence. In addition, the present finding is in accordance with that of Nygaard et al (2013) [54] who reported that PFM training increases PFM strength and reduce the prevalence and severity of urinary incontinence. Moreover, Pereira et al (2012) [55] concluded in their review that pelvic floor muscle training in isolation or in conjunction with multidimensional exercises seem to be effective techniques in the reduction of urinary symptoms among older women with UI.

In the present study it was observed that pelvic floor muscles strength had significantly increased after the implementation of Kegel's exercise for twelve weeks among the study group. At the same time, such increase was not found among the control group after the implementation of routine hospital care. This present study result is supported by Rashed (2018) [56] and Antônio et al (2018) [57] studies. *The first* found that the pelvic floor muscles exercises program increased the muscles strength among the study group compared to the control one. Moreover the study group experienced an increase in muscles strength after the program as compared to before. *The second* concluded that pelvic floor muscle training increases pelvic floor muscle strength more in postmenopausal women who are not using hormone therapy than those who using hormone therapy.

The present study result also agrees with the results of Bretotto et al (2017) [58], Hussein et al (2015) [59], Cavkaytar et al (2015) [60] and Soni et al (2014) [61]. *The first* concluded that pelvic floor muscle training with and without biofeedback is associated with increased muscle strength and improved quality of life in postmenopausal women with stress urinary incontinence. *The second* studied the pelvic floor muscle training program for Egyptian women with neglected urinary incontinence. Their results revealed that there was a statistically significant difference between the intervention and control groups in both the vaginal digital test and provocation test at the end of 3 months. Hence PFM strength significantly improved in the intervention group than control group. *The third* also found a statistically significant improvement in pelvic floor muscle strength in the Oxford scale after Kegel's exercises within each group (p=0.001). *The fourth* concluded that Kegel's exercise is associated with increase in strength and endurance in pelvic floor muscles. Increase in endurance translates in to better holding capacity and less or no episode of leakage. Hence Kegel's exercise is better management for urinary incontinence.

Dissimilar to the finding of the present study, Wang and Ying (2009) [62] studied the effect of pelvic floor muscle training on the pelvic floor muscle tonus. They found that lack of statistically significant difference in PFM strength measured by vaginal digital test and provocative test, for management of UI after PFMT. They reported that, PFMT in the short-term cannot significantly improve the PFM tonus for UI patients.

The present study also revealed that quality of life had significantly improved after the performing of Kegel's exercise within the study group. Meanwhile, such improvement was not found within the control group after the application of routine hospital care. Where all domains of QoL as the perception of health, impact of the incontinence, limitations of daily activities, physical limitations, social limitations, personal relationships, emotions, sleep, coping measures, and symptom severity significantly improved in the study group than in control group. This result suggests a possible positive effect of Kegel's exercises on improving the QoL among menopausal women with urinary incontinence.

The present study result is similar to the results of Ptak et al (2019) [63] who concluded that both the combined training of the PFM and the synergistic muscle, and the only PFM exercises improve the QoL of women with SUI. In addition, this finding is also in agreement with the results of another study done by Radzimińska et al (2018) [64] who conducted a review to assess the impact of PFMT on the QoL of women with UI among 2,394 women in 24 selected studies. They concluded that PFMT is an effective treatment for UI in women. PFMT significantly improves the QoL of women with UI, which is an important determinant of their physical, mental, and social functioning. Dumoulin et al (2018) [46] also found that women with stress and all types of urinary incontinence their QoL was improved in the PFMT groups. Moreover, the present finding is in accordance with that of Bretotto et al (2017) [58] who concluded that pelvic floor muscle training, with and without biofeedback, is associated with improved quality of life in postmenopausal women with stress urinary incontinence. Ptak et al (2017) [65] also concluded that quality of life in women with stage 1

stress urinary incontinence improves after conservative treatment in form of pelvic floor muscle training. Both PMF training with additional exercises for synergistic muscle (TrA) and isolated PFM training contribute to a significant improvement in QoL. Furthermore, The present result is similar to the results of Zarawski et al (2017) [66] who assessed the impact of pelvic floor exercises on the quality of life of women with urinary incontinence during pregnancy and the postpartum Period. They reported that there was a significant improvement in the quality of life of women after implementation of pelvic floor muscle exercises, especially during the postpartum period. They added that there was a beneficial effect of pelvic floor training from the perspective of UI prevention.

This present study result is supported by Cavkaytar et al (2015), [60] Hussein et al (2015), [59] Stearman et al (2014) [67] and Fitz et al (2012). [68] *The first*, concluded that home-based Kegel exercises under no supervision have been found effective in improving QoL in women with SUI and MUI but give much improvement in women with SUI. They added that home-based Kegels exercises can be used widely in clinical practice due to low costs, high patient compliance and good efficacy. *The second*, found highly statistically significant difference in the post test in favor of the intervention group as regards QoL. *The third*, reported that PFMT improved activity and reduced psychological impact. *The fourth*, found a significant decrease in the mean scores of the domains of QoL regarding the perception of health, impact of the incontinence, limitations of daily activities, physical limitations, social limitations, personal relationships, emotions, sleep and measures of severity. They also concluded that PFM training resulted in significant improvement in the QoL of women with SUI.

V. CONCLUSION

In the light of the present study results, it can be concluded that H1 is accepted; while H0 is rejected, where menopausal women with urinary incontinence who practice Kegel's exercise exhibit less severity of urinary incontinence, more pelvic floor muscle strength and improve quality of life than those who don't practice it. Kegel's exercise has significant positive effect on strengthens pelvic floor muscle, reducing severity of UI and significantly improves the QoL of menopausal women with urinary incontinence.

VI. RECOMMENDATIONS

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

1. Kegel's exercise can be used as an effective management for treating urinary incontinence and improving quality of life among menopausal women.

2. In service training programs for nurses about the utilization of Kegel's exercise for management of urinary incontinence is recommended.

3. The developed booklet with its simple instructions and illustrations should be utilized in hospitals as a teaching aid for incontinent women.

4. Replication of the present study under different circumstances (sampling, setting, measurement, duration of management) is recommended to validate its results.

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