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Effect of Nursing Intervention on Urinary Incontinence among Menopausal Women: Quasi-experimental study

[1]Inas Kasem, [2]Safa Gaber Salem, [3]Hadayat Abdel-Raof Amasha, *[4]Amal M. Gamal

[1]Professor of Maternal and Newborn Health Nursing, Faculty of Nursing, Menoufia University, Egypt

[*2] Assistant Professor of Maternal and Newborn Health Nursing, Faculty of Nursing, Menoufia University, Egypt

[3]Assistant Professor of Maternal Health Nursing and Newborn, Faculty of Nursing, Damietta University, Egypt

[4] Lecturer of Maternal and Newborn Health Nursing, Faculty of Nursing, Menoufia University, Egypt

*[4]Corresponding Author's Email: dr.amal_gamal@yahoo.com

Abstract: **Stress incontinence is a more common health problem in older women and has a negative impact on menopausal women's well-being and is also considered one of the most expensive health problems.**

Aim: This study aimed to examine the effectiveness of nursing intervention on urinary incontinence of menopausal women.

Methods: A quasi-experimental one group study design was used. A convenience sampling technique was used. Two instruments were used to collect data about, sociodemographic, medical, obstetrical and gynecological history and characteristics of urinary incontinence. Urinary incontinence was assessed before, immediately after, and three months after implementing the program.

Results: The results revealed that there were highly statistically significant improvements among women after practicing the Pelvic Floor Muscle Exercise regarding to symptoms and frequency of stress urinary incontinence.

Conclusion: The pelvic floor muscle exercise was effective in the management of women with stress urinary incontinence. Therefore, it is recommended to design educational programs for increasing the awareness of women about stress urinary incontinence and how to deal with it.

Keywords: **Menopausal women, pelvic floor muscle exercises, stress urinary incontinence.**

1. INTRODUCTION

The frequency of urinary incontinence (UI) is difficult to determine, and there is no unequivocal data indicating the percentage of people suffering from this disorder. According to data adopted from the 6th International Consultation on Incontinence (ICI), the problem of UI in the whole population ranges from 4% to 8%. (Global Forum of Incontinence, 2018).

It is worth noting that the number of people affected by this health problem in the entire world population has been steadily growing over the last decade. In 2008, 346 million people suffered from UI, while in 2013 women suffering from UI increased to 383 million. Recently, it was estimated that, number of people with UI increased to 420 million: 300 million of them were women and 120 million were men (Abrams et al., 2017).

There are two types of incontinence, true UI and false incontinence; true in which urine passes through urethra. The basic mechanisms responsible for that reaction are poor urethral support by the pelvic floor muscles and deficiency in intrinsic sphincter deficiency (Radziminska et al., 2018).

The most common type of UI in women is Stress Urinary Incontinence (SUI), which is defined as involuntary leakage of urine that occurs with sudden increase of abdominal pressure, or effort as: coughing, laughing, sneezing, running or other exertion (Global Forum of Incontinence, 2018). Stress urinary incontinence (SUI) affects an estimated 20-40% of females, Prevalence of SUI rises with increasing age; 40% of women aged ≥70 years old were affected (Whooley, et al., 2020, & Melson & Gyhagen, 2019). Estimates of the prevalence of SUI in women do not reflect the true scope of the problem, because of under-reporting as it causes social embarrassment for women who are affected with SUI (Brown et al., 2018).

Any healthcare provider who is interested in menopausal women health should realize that menopause is more than just an endocrinological events; women may experience more stress urinary incontinence after menopause due to pelvic floor muscles atrophy when the estrogen level in the blood drops, the major effect of estrogen decline leads to changes in the vaginal and urethral inner wall, a decrease in the tone of vaginal muscle and vascular profusion, these changes take part in the occurrence of SUI (Hillard, 2019).

Despite of SUI is not life-threatening illnesses, very common and is a major health problem affecting the quality of women's life and confer a substantial health care burden on the aging population which should not be ignored. (Whooley, et al., 2020). Eight out of ten times continence can be improved through exercise, biofeedback or surgical intervention (Ptak, et al., 2019, Pereira, et al., 2013).

The pelvic floor muscle exercise (PFME) consists of repeatedly tightening and releasing the muscles of the “pelvic floor” to strengthen them. The exercise decreases urine leakage in women with stress and urges urinary incontinence with overactive bladder frequency. Also, it increases support to the urethral sphincter and bladder muscle. The best part of this exercise is that it is free, painless, and can be done at any time of the day (Lee, et al., 2017).

Clinicians are confused to select the optimal way to treat SUI. Health promotion efforts should be targeted to all adults especially women after menopause, and should include strategies to maintain good genitourinary health (Yang, et al., 2020). Maternity nurse can make a difference in the women health across all settings, and is playing a key role in the prevention, early detection, and management of urinary incontinence.

The maternity nursing interventions include offering management strategies physical treatment (as pelvic floor muscle exercise) and providing patients education and encourage them to deal with urinary incontinence. The implications of these conditions, and indeed some of their treatments, can have profound implications for a menopausal women’s well-being and ability to function normally (Hillard, 2019).

On the other hand, urinary incontinence has a negative impact on menopausal women’s well-being and is considered one of the most expensive health problems, forces financial burden on individuals and society (Bradway et al., 2010). It is less common among men than women. Ten to thirty percent of females aged between 15 to 64 years old are thought to suffer from SUI, compared to 1.5% to 5% of men. Stress incontinence becomes more common in older women. One in each five women over the age of 40 have some degree of this problem (Nillson et al., 2009). Despite the condition remains under-reported to medical practitioners, it is estimated that up to 50% of women experience urinary incontinence at some point in their lifetime. So, the researchers want to shed light on the effectiveness of Pelvic Floor Muscle Exercise (PFME) on Stress Urinary Incontinence among women after menopause.

Aim

The current study aimed to examine the effectiveness of nursing intervention on urinary incontinence of menopausal women.

Research Hypothesis

Menopausal women who performed PFME have no urine leakage, less pain with full bladder, and little dribbling of urine under any kind of strain after performance of PFME.

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2. METHODS

Research design

One group, pre- posttest quasi-experimental research design was used to achieve the purpose of the study. Quasi experiments are studies that aim to evaluate interventions but that do not use randomization. Like randomized trials, quasi experiments aim to demonstrate causality between an intervention and an outcome (Polit & Beck, 2018).

Setting

The study was conducted in two randomly selected maternal and child healthcare centers in Menoufia Governorate, the delta of Egypt (both centers considered in rural areas). These two centers are affiliated to the Ministry of Health and Population (MOHP). The number of menopausal women who attended these centers were 2296 and 2726 respectively during data collection.

Sample

A stratified random sampling technique was used to select two maternal and child healthcare centers. Sample size was estimated using the following equation:

$$n= (Z^2 \times P \times q)\ D^2.$$

Assumptions were: power (80%) and CI of (95%) so, the total sample size from the two centers were 80 participants.

Exclusion criteria

Illiterate, obese (women who have a Body Mass Index (BMI) greater than or equal to 30)**,** with uterine prolapse, complete denervation of pelvic floor, uncontrolled diabetes mellitus, or malignancy. Moreover, women with urinary tract problems such as severe incontinence, continual leakage, or severe vaginal or urinary tract infection. As well as, women with impaired mental health such as dementia and unstable seizure disorders. Finally, women receiving any medications that affect the function of lower urinary organs as diuretics and psychotropic medicine are excluded from the study sample.

Instruments

Data were collected using two instruments in addition to biosocial characteristics of study sample. A Structured questionnaire sheet developed by the researchers, which was filled in by all participants in the study. This questionnaire included two parts: The biosocial characteristics of study sample such as: age, educational level, occupation and number of family members. While, the second part included: medical, surgical, obstetric and gynecological history of participants. Medical and surgical history included the presence of medical disorders such as persistent cough, constipation, controlled diabetes mellitus, and hypertension. Whereas, obstetric and gynecological history included information such as number of pregnancies, number of labors, type and place of delivery.

First instrument

Characteristics of stress urinary incontinence questionnaire was developed by the researchers. It included a special questions related to precipitating condition of incontinence such as: coughing, sneezing, laughing, lifting or nervousness, positional changes, questions about the presence of any pain when the bladder is full and frequent evacuation of the bladder, dribbling after urination and symptoms of urinary tract infections. To validate the tool, it was independently assessed by 2 obstetric and gynecology specialists and 3 professors of nursing who reviewed the instruments for content validity, eligibility and methodological quality. Data were extracted then cross-checked. Disagreements were resolved by discussion and suggestions were incorporated into the instruments. To test the reliability of the instrument, test- retest was applied for testing the internal consistency of the instruments. It was done through the administration of the same instruments to the same participants under similar conditions on two occasions. Scores from repeated testing were compared (r= 0.87).

Second instrument

Clinical Examination and Laboratory Investigation: medical history and physical examination are essential to diagnose SUI and to select appropriate therapy (Committee on Practice Bulletins, 2015). These examinations included: general examination, abdominal examination, pelvic examination, Pelvic floor muscle tone and strength (PFMS), and Stress provocation test (SPT).

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General examination was performed to determine women obesity based on Body Mass Index (BMI). Obese women with body mass index greater than or equal to 30 were excluded from sample.

Abdominal examination was done for any enlargement or masses, and for bladder distension. If there was any abnormalities women were excluded from the sample and referred to a specialist.

Pelvic examination was done to detect signs of vaginal infection, and uterovaginal prolapse that may lead to irritation during voiding. Those women were also excluded from study sample.

Pelvic floor muscle tone and strength (PFMS) was tested. Women were asked to squeeze around examiner's fingers with keeping the muscles of abdomen, gluteal, and thighs relaxed. The degree of strength was evaluated according to the repetition duration of muscle contraction (Schreiber, et al., 2017). This clinical test was simple and repeated.

Stress provocation test (SPT) was performed when women's urinary bladders were full. At that time, women were asked to hold bladders full for 1-2 hours prior to start the test, then they were asked to cough vigorously 5 times while researchers observed for urine leakage (Dass, et al., 2013).

Urine leakage was estimated at four likert scale (0-3), (0) indicated no leakage, (1) indicated slight leakage, (2) indicated moderate leakage, and (3) indicated severe leakage of urine through the whole test.

Complete urine analysis was done for all women before recruited in the study, urine specimens were sent immediately to a laboratory, any abnormal results led to exclusion from study sample and were referred under gynecologist supervision to a urologist to receive treatment.

Ethical considerations

The study was approved by the University Ethical Committee. Potential participants handed a supportive material in the form of guide booklet after the pre-test. The booklet was prepared by researchers and validated by three experts in nursing. It contained information regarding anatomy of the female reproductive and urinary systems, definition of stress urinary incontinence, causes, risk factors, sign and symptoms, the pelvic flora exercise, its benefits and how to perform it. Agreements of women to perform the pre intervention tests were considers as a consent to be enrolled in the study. Anonymity and confidentiality were assured and participants were told that they could withdraw from the study at any stage without any harm. Participants were assured that there were no risks involved in this study.

A pilot study was conducted on ten percent of the study women to estimate the time needed for data collection and the researchers determined the feasibility of data collection procedures. As well as, the women with stress urinary incontinence were tested on 2 occasions, with separated two week interval, to determine standard errors of measurement for all study variables. On the basis of the pilot results the necessary modifications were done, those women who were included in the pilot study were not included in the final analysis.

Data collection procedure

The current study was conducted on three phases: preparatory, implementation, and evaluation phases.

Preparatory phase: An extensive literature review related to the study subject was done. Based on this review, the researchers developed the guide booklet to help facilitate explanation of the PFME.

***Implementation phase*:** The data collection started from April 2017 and was completed by November 2017.The researchers applied the implementation phase according to the following steps:

First step: The researcher met the study group for 3 days weekly from 9.00 am to 1.00 pm. The researchers randomly divided the participants into two equal groups: one control group (CG) who received no nursing intervention, but for ethical consideration, they were given a guide booklet after the pre- test and referred to physical therapy treatment.

The other groups was the study group (SG) who was divided into 16 subgroups 5 women each, each group attended 2 nursing training sessions about PFME. The researchers introduced themselves to the participants, provided verbal explanation of the study and answered all related questions. Then, they were asked to complete the sociodemographic data and were given a pre-test about their knowledge regarding the PFME.

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Second step: The researchers started to train participants of the study group on how to perform PFME using the guide booklet. The researchers used lectures, group discussion and video tabs. Afterwards, participants were asked to fill in the immediate posttest and were given a telephone number to call researchers for any questions and researchers kept in touch with participants for weekly follow up. After treatment completion, researchers instructed women about benefits of exercises and they were given a booklet about PFME which helped them to continue exercises at home for twelve weeks with two sessions per weekly. They were interviewed again after 3 months for follow up and final assessment.

Evaluation phase: Assessing the effectiveness of nursing intervention. This phase was done after 3 months to evaluate the effectiveness of the training program.

Subjective evaluation: The researchers met the women again and evaluated the signs and symptoms after implementing the PFME. Patient reported quantification of symptoms, and all women were asked about their opinions about outcomes of the intervention.

Re-demonstration of the stress provocative test: It was performed to evaluate the progress of continence condition and the results were compared to result which were conducted before intervention.

Evaluate the progress of PFMS: Vaginal palpation like that of initial visit was done to determine the progress of pelvic floor muscle strength score. The score of the final visit was compared with the score of initial visit, and the progress was evaluated.

Statistical Analysis:

Data were statistically analyzed using the SPSS version 23 for windows. Number and percentages were used to explain qualitative data. Chi square test was done for qualitative variable analysis too. Friedman test (χ^2) for three or more variables measured on the same respondents were used to measure the difference among pre-post, and follow up after three months. Z-test was used to test the mean of a distribution. A z-test has a single critical value. Significant difference among study variables were estimated at a p value of ≤ 0.05.

Limitation of the study:

Many women neglected the weekly sessions and didn't complete the program. So, the researchers performed the PFMT with them through home visits.

3. RESULTS

Table (1) displayed the biosocial characteristics of the study sample. The mean ages of women 46.2 years old. The mean years of marriage were 22.4. Majority of study sample had secondary school education, and were not working. Whereas, the majority of the working women (88.2%) were employed in governmental job.

Table (1): Biosocial characteristics of study sample (N=80)

Variables	Mean	SD
Age (in years)	46.2	6.2
Years of marriage	22.4	3.6
Variables	No	%
Level of education		
Read & write	4	5.0
Secondary	67	83.8
University	9	11.3
Working condition		
Working	17	21.3
Not working	63	78.8
Type of Job (n=17)		
Governmental	15	88.2
Non-governmental	2	11.8

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Table (2) showed the obstetrical history of the study sample. The table indicated that the majority of women had four or more pregnancies, with vaginal deliveries, two to three times of abortion, and four or more lived children.

Table (2): Percentage distribution of study sample according to their obstetrical history (N=80)

Variables	No	%
Number of pregnancies		
≤ 3	22	27.5
≥4	58	72.5
Number of abortions		
1	25	31.2
2-3	55	68.8
Number of live children		
≤ 3	33	41.2
≥4	47	58.8
Type of delivery		
Vaginal	54	67.5
Cesarean Section	26	32.5

Table (3) declared the percentage distribution of risk factors among women with SUI. The table reflected that the majority (92.5%, 85%) respectively of women carrying heavy loads frequently and had chronic constipation as risk factors for SUI. Whereas, (70%) of study sample did not have chronic cough.

Table (3): Percentage distribution of risk factors among women of stress urinary incontinence (n=80)

Variables	No	%
Carrying heavy loads		
Sometimes	6	7.5
Frequently	74	92.5
Chronic constipation		
Yes	68	85
No	12	15
Chronic cough		
Yes	24	30
No	56	70

Table (4) revealed the knowledge about pelvic floor muscle exercise among study sample. The table showed that there was highly statistical significant difference at p value of (0.001) of study sample's knowledge about PFME from pre to post, and from pre to follow-up for intervention of PFME with remarkable higher (χ^2 =94.4, 94) respectively for how many times should women perform the exercise/week. However, there was statistical significant difference at p value of (0.05) between posttest and follow-up test with a higher (χ^2 =8.8 & 7.2) respectively for times of conducting PFME and its benefits among study sample.

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Table (4) Knowledge about Pelvic Floor Muscle Exercise (PFME) among study sample (N=80)

Areas of knowledge	Time											
	Pre		Post		Follow-Up		Pre-Post		Pre-Fo		Post-Fo	
	No	%	No	%	No	%	χ^2	P	χ^2	P	χ^2	P
Definition of PFME	02	2.5	76	95.0	72	90.0	86.8	0.001**	76.8	0.001**	1.4	0.23
How many times of PFME	04	5.0	78	97.5	67	83.3	94.9	0.001**	94.0	0.001**	8.8	0.002*
Interval of PFME	00	0.0	52	65.0	48	60.0	58.9	0.001**	56.8	0.001**	0.42	0.62
Benefits of PFME	04	5.0	76	95.0	65	81.6	84.8	0.001**	81.6	0.001**	7.2	0.007*

Pre-Fo: Pre/ follow up

Post-Fo: Post/follow up

* *P≤ 0.05*

** *P≤ 0.001*

Table (5) reflected the symptoms of SUI reported by study sample pre-post and follow-up which was conducted three months after intervention. The table showed highly statistical significant difference at P≤0.001 between the SUI symptoms pre-post intervention and pre-follow for intervention. The table indicated remarkable progress of SUI among study group immediate after intervention and after three month of the intervention with the highest (χ^2 = 96.8) for urine dribbling. The table also indicated that 90% of the study sample had urine dribbling, pain with full bladder, and urine dribbling during laughing or coughing. All these symptoms decreased to (10.0%, 15%, 6.3%) respectively immediate post intervention with the highest (χ^2 = 109.1). While, with follow up after three months there were slight elevation (15%, 18.7%, 11.3%) respectively of the same symptoms between post and follow up of intervention.

Table (5): Self-reported symptoms of stress urinary incontinence among study group pre-post and follow-up (n= 80)

Symptoms*	Pre		Post		Follow- up			
	No	%	No	%	No	%	χ^2	P
Involuntary urine flow	67	83.8	6	7.5	9	11.3	94.6	0.001**
Feeling wet	47	60.3	5	6.3	7	8.75	55.1	0.001**
Pain with full bladder	72	90.0	12	15.0	15	18.75	84.9	0.001**
Urine dribbling	72	90.0	8	1.10	15	18.8	96.8	0.001**
Urine dribbling with***								
Coughing	71	88.8	8	10.0	12	15.0	93.6	0.001**
Sneezing	61	76.3	7	8.8	8	10.0	82.3	0.001**
Laughing	72	90.0	5	6.3	9	11.3	109.1	0.001**
Carrying heavy loads	62	77.5	8	10.0	15	18.8	61.4	0.001**
More than one causes	67	83.8	6	7.5	12	15.0	83.8	0.001**

* Not mutually exclusive

**P≤0.001

***More than choice was indicated for the question

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Table (6) reported the distribution of study sample according to results of SPT before and follow up after three months of intervention (PFME). The table indicated a high statistical significance differenceamong all types of leakage among study sample at p value of (0.001) The table implied that before PFME all study goup had urine leakge which improved to almost three quarters of study sample did not have leakage three months after PFME. Around quarter of study sample had slight leakage, which decreased to less than a quarter of study sample three months after intervention. Around three quarters of study sample had moderate leakage before PFME which decreased to none of the study group had moderate leakage three months after PFME. None of the study group had severe level of urine leakage neither before nor after intervention.

Table 6: Distribution of study group according to results of SPT before and follow up after three months of intervention (PFME)

SPT	PFME (n= 80)				Z	P
	Before		Follow-up			
	N	%	No	%		
No leakage	0	0	65	81	4.03	0.001**
Slight leakage	21	26	15	19		
Moderate leakage	59	74	0	0		
Severe leakage	0	0	0	0		

** p≤ 0.001

Fig. (1): showed the percentage distribution of study sample according to the practice of PFME pre, post, and follow up of intervention. The figure declared that none of the study group performed PFME before the intervention. However, 95% of women practiced PFME immediate after intervention, and 90% of study them continued the practice of PFME by regular manner till the follow up three month after the intervention.

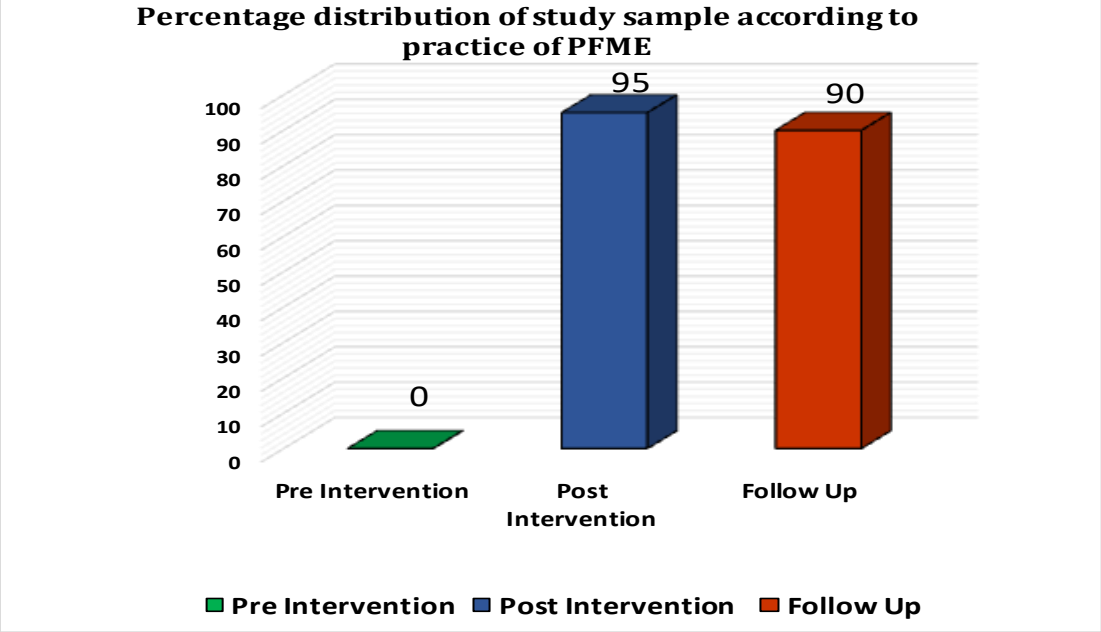

Fig. (1) Percentage distribution of the women according to practice of PFME

Fig. (2) Delineated study's sample self-reported evaluation of SUI after three months of evaluation. The figure indicated that the majority (68%) of study sample had improved symptoms of SUI. While, (32%) of them had completely cured from SUI.

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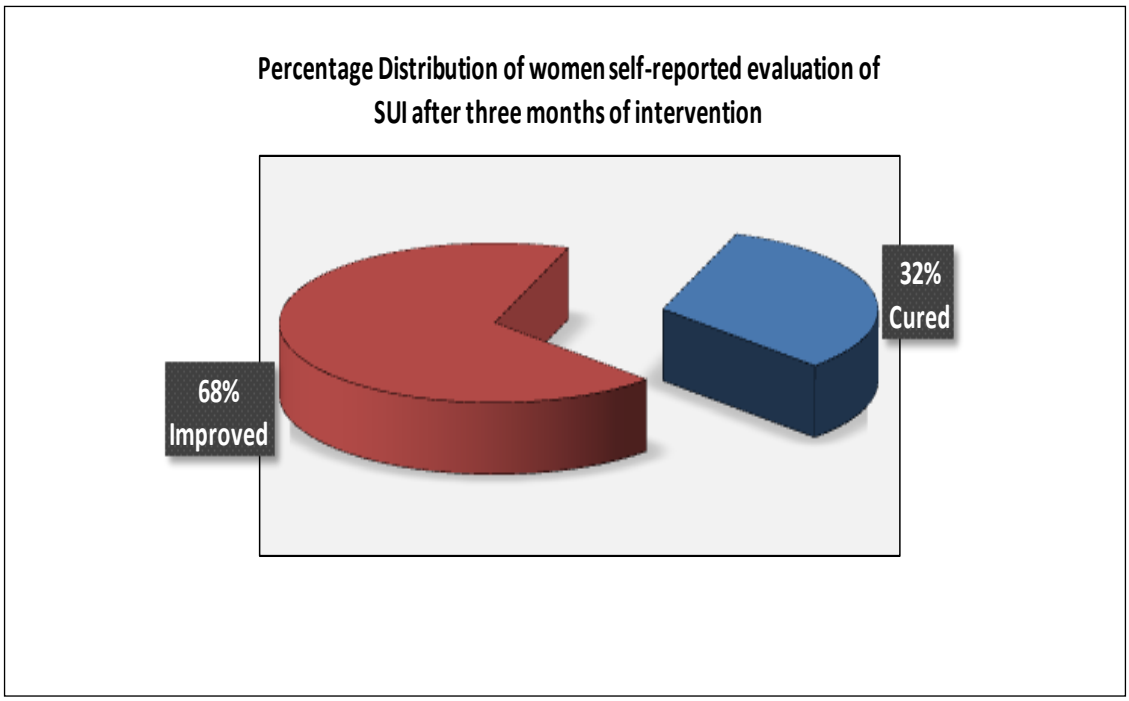

Fig. (2) Percentage distribution women self-reported evaluation of SUI after three months of intervention

4. DISCUSSION

Stress urinary incontinence is a common health issue among menopausal women and traditional management is recommended as the first-line treatment. Pelvic floor muscle exercise is a helpful method in the treatment of urinary stress incontinence for women at menopause. Therefore, the current study aimed to examine the effectiveness of nursing intervention on urinary incontinence of menopausal women. The results of the current study showed the risk factors of SUI, women knowledge about PFME, and the effect of nursing intervention through PFME on SUI among women at menopause.

Risk factors of stress urinary incontinence

The current study indicated that carrying heavy loads in a frequent manner, and chronic constipation were the risk factors of SUI among menopausal women. On the other hand, the study revealed that constipation was not a risk factor for SUI. These results could be true because majority of women in rural areas had used to help their partners in farming works which increase intraabdominal pressure. Moreover, majority of study sample were secondary school educated which may led to illiteracy about healthy foods especially with the physiological changes women have after menopause. These factors leads to constipation which was the second risk factor for SUI among women of this study. These results were supported by a study conducted in western Turkey by Tozun et al., (2009) which revealed that cardinal and uterosacral ligaments, connective tissue and pelvic floor muscle may be damaged chronically because of increasing intra-abdominal pressure occurring with hard manual work. On top of that, BØ & Nygaard, (2020) declared that general exercise training, and carrying heavy loads stretches and weakens the pelvic floor. Based on the fact that increases intraabdominal pressure, and if the pelvic floor muscles are not able to contract quickly or strongly enough to counteract the increase in abdominal pressure, the levator hiatus could become wider, stretching and weakening the muscles. Accordingly, overload of the pelvic muscle floor may increase the risk of SUI.

Knowledge about PFME

Concerning level of knowledge, it was found that most of the studied women had poor knowledge at pre-intervention about PFME definition, frequency, interval and benefits. While, post intervention more than two thirds of the study sample upgraded their knowledge. The insufficient knowledge about PFME among study sample were related to the low

educational level of majority of study sample which stopped at secondary school education. This result is consistent with a study that conducted by Naser-Eldeen (2011), who showed that knowledge of PFME was poor and improved after the intervention. In contrast, a study by Ebbesen et al., (2013) found that despite that 95.7% of 720 women knew PFME, only few women who actually performed the exercise. This discrepancy means that knowledge alone is not a factor to adopt a behavior.

Effect of PFME on improving SUI

The study concluded that majority of study sample had no leakage after three months of intervention, none of the study had moderate leakage at the time for follow up, and there were decrease in the slight leakage among study sample during follow up. Regarding subjective women's evaluation about nursing intervention of PFME, the results showed that the majority of women reported improvement, whereas only minority of study sample reported cured after practicing the exercise. In the current study, majority of study sample reported involuntary urine flow, urine dribbling, and pain with full bladder pre intervention. The majority of study sample also reported the cause of urine drippling were associated with cough, laugh or more than one cause. After performance of PFME, there were remarkable decrease in all these symptoms among study sample and around one third of study sample had cured from all these symptoms. Whereas, at the three month follow up, these manifestations were slightly increased in comparison to post intervention of PFME. Because women had enough information about PFME; its duration, intervals, and benefits, immediate application of the exercise had remarkable decrease in all symptoms of SUI reported by study sample. The slight increase in these symptoms was related to irregularity of some of the study sample in practicing the exercise. These results were in agreement with a study conducted by The National Institute of Clinical Excellence (2006) guidelines on the management of urinary incontinence in women. The study recommended that PFM exercise was found to be effective in the management of urine incontinence in female patients in more than 50% of cases. Hence, daily PFM training is an effective management for SUI, compared with no treatment, over the short term.

Similarly, a study by Cammu et al. (2010), conducted a 10-year follow-up for women after Kegel's PFME for genuine stress incontinence. The study concluded that when PFM training is initially successful, there is a chance of 66% that favorable results will persist for at least ten years.

The current study denoted highly statistically significant differences among the studied group after implementation of the program. A study finding by Milsom et al., (2016) supported this result.

5. CONCLUSION

Pelvic floor muscle exercise was very effective with highly statistically significant improvements among women at menopause. After practicing PFME regularly women felt better and symptoms of SUI were remarkably decreased. Therefore, the current study recommended that early detection of stress incontinence among menopausal women is essential. Increasing awareness of menopausal women about stress urinary incontinence as a treatable and non-embarrassing condition is important too. Increase awareness about the positive effect of practicing pelvic floor muscle exercise for women especially after menopause for better quality of life.

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