

# The Impact of Nursing Interventions on the Control of Urinary Incontinence among Women

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**Abstract:** Urinary incontinence is one of the greatest problems that affect about third of adult women's quality of life. It also affects the sufferer's confidence, self respect, personal relationships and cause patients to cease employment, increase dependence on caregivers and restrict activities of daily life. Urinary incontinence is a basic nursing care issue, so nurses must be more creative, inventive, and bold in developing new approaches to preventing and managing urinary incontinence. The main objective of this study was to determine the impact of nursing interventions on the control of urinary incontinence (stress, urge, and/or mixed) among adult female patients. This study was conducted in the urodynamic outpatient clinic at Alexandria Main University Hospital. The subjects of the study consisted of 60 adult female patients. In relation to incontinence associated urinary symptoms, the results showed that, the majority of the studied patients were aware of the act of incontinence, and were not able to delay voiding. As regards measuring pelvic floor muscle tone, the results showed that, (16.7%) of the studied patients had poor contractions before applying the nursing interventions. As regards the amount of leakage (difference in pad weight using provocation test), the results revealed that (80%) of patients had damp pad (<0.5-7 gm). The reduction in incontinence episodes was most pronounced early in the second week and had its greatest effect at sixth week. There was a significant improvement in the pelvic floor muscle' tone, and the mean percent improvement was 38.8%. In respect to percent reduction in incontinence episodes, the majority of patients (55%) achieved complete cure, while more than third of them improved, since they achieved (50>100%) reduction in incontinence episodes. Moreover, there was the significant reduction in the amount of leakage after applying the nursing interventions. The results illustrate that, there wasn't significant relationship between patients' age, gravidity, duration of symptoms and percent improvement of incontinence episodes after applying the nursing interventions. On the other hand, there was a positive significant correlation between the amount of leakage and incontinence episodes after applying the nursing interventions such as that patients with the smallest amount of leakage before interventions had the fewest episodes of incontinence after interventions.

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## 1. Introduction:

Recent years have brought enormous changes in the health care system. Health for all is not an achievable goal without considering women's health and their developments. An often neglected but important area of women's health involves the pelvic floor. However, the issues of pelvic floor health are often addressed only after symptoms have presented<sup>(1)</sup>. Urinary incontinence is one of the greatest problems that affect women's quality of life, since it affects about third of adult women<sup>(1,2)</sup>.

The international Continence Society defines urinary incontinence as: the condition in which the involuntary loss of urine is a social and demonstrable problem<sup>(2)</sup>. Not only does it cause anxiety and embarrassment, but it also affects the sufferer's confidence and self respect. Urinary

incontinence is associated with shame, anxiety, embarrassment and silence. It also affects the sufferer's confidence and self respect, since they often prefer to conceal the problem for as long as possible<sup>(3, 4)</sup>. Moreover, Contillo (2007) mentioned that incontinence has been shown to affect personal relationships and cause patients to cease employment, increase dependence on caregivers and restrict activities of daily life<sup>(3)</sup>. Thus, it is difficult to establish the true prevalence of urinary incontinence.<sup>(5)</sup>

However, it is estimated that incontinence is more common in women, particularly those in the middle age, since it affects at least 30 % of women, up to 10 % of them wear sanitary protection against leakage<sup>(6)</sup>. Palkhivala (2005) reported that women are more affected than men, since one in four adult

women and one in ten adult men are affected by urinary incontinence during their life time<sup>(7)</sup>.

According to statistical records of Alexandria Main University hospital, there are about 300 and 350 adult women suffering from urinary incontinence admitted to the urodynamic clinic during the years of 2008 and 2009 respectively<sup>(8)</sup>.

Urinary incontinence is defined as the involuntary loss of urine so severe to have a social and a hygienic problem. It can be produced by many pathological, anatomical, or physiological factors that cause intravesical pressure to exceed the maximum urethral pressure. Intravesical pressure can be raised by involuntary detrusor contractions (unstable bladder or detrusor hyperflexia), by acute or chronic bladder over distention (urinary retention with overflow), or by an increase in intra-abdominal pressure<sup>(9,10)</sup>.

Risk factors for developing urinary incontinence include factors contributing to excessive elevations of intra-abdominal pressure as constipation and obesity. Other factors incorporate irritants to the bladder muscles which increase sensory awareness of bladder filling and sensory urgency, as well as, reduce bladder capacity. Irritants include: dietary (smoking, alcohol, caffeine, acidic foods); mechanical pressure as in fecal impaction, tumors of the bladder or pelvis; urinary tract infection; renal or bladder stones; reduced estrogen levels in postmenopausal women; benign prostatic enlargement which increases urethral resistance; and medical conditions as diabetes since glucosuria has an irritant effect on the bladder<sup>(11)</sup>. Radiation therapy to the pelvis, medications as diuretics can directly contribute to bladder overactivity. In addition, neurologic condition compromise central nervous system control of the bladder causing urge incontinence<sup>(11,12)</sup>.

Urinary incontinence encompasses three basic types: transient (acute), neurogenic, and established (persistent)<sup>(5)</sup>. Transient incontinence is usually associated with an acute medical or surgical condition. Neurogenic incontinence, neurogenic bladder dysfunction, may have a sudden or progressive onset, depending on the disease or trauma that causes the lesion within the nervous system<sup>(5,13)</sup>.

The most commonly encountered clinical forms of established urinary incontinence in adults are stress incontinence, urge, overflow, and mixed urinary incontinence<sup>(3,5)</sup>. Stress incontinence is sudden leakage of a small amount of urine that occurs with increased abdominal pressure such as laughing or coughing, it occurs when intravesical pressure exceeds intraurethral pressure in the absence of detrusor activity. Whereas, urge incontinence is leakage of moderate to a large amount of urine that

occurs seconds to minutes after the first sensation to void as a result of detrusor instability. Mixed incontinence is defined as a combination of both urge and stress types. Overflow incontinence is characterized by continuous dribbling, it occurs when intravesical pressure exceeds intraurethral pressure with bladder distention<sup>(5)</sup>.

Pires (2002) and Mason et al (2003) mentioned that the aim of urologic nursing assessment is to objectively confirm the incontinence, identify factors contributing to incontinence, and to identify persons who may need further evaluation to develop a nursing care plan that will maximize the patient potentials for urine control<sup>(12,14)</sup>. Component of the assessment should include: history and physical examination with additional tests.

Pires (2002) added that determining the severity of the problem in patients with incontinence may influence the type of treatment selected, and is essential if the response to treatment is to be judged<sup>(12)</sup>. It is recommended that the actual amount of urine leakage should be measured because clinical examination can provide subjective information. Often leakage is not demonstrable when the patient is being examined, and therefore, its amount at other times can only be guessed<sup>(15)</sup>.

Provocation test and voiding record are recommended in assessing patients' condition and in evaluating the effectiveness of the therapeutic exercise program<sup>(15,17)</sup>. It is performed by asking the patient to relax and cough vigorously while the examiner observes the urethra for loss of urine<sup>(16)</sup>. If leakage occurs instantaneously, then stress urinary incontinence is suspected. If leakage is delayed or persists after the cough, then urge incontinence or detrusor over activity is suspected. This test is performed when the patient has a full bladder in both standing and supine positions<sup>(12,16)</sup>. In women, this test had a 62% positive predictive ability for sphincteric incompetence<sup>(16)</sup>.

Burns (2000) stated that the simplest method of measuring urine loss is by weighing of a perineal pad before and after use. In general, pad test involves the patient's performance of provocative activities while wearing a pre-weighted pad. Upon completion of the activities, the pad is reweighed to determine the amount of urine loss during the test. An increase in urine loss of 2 gram is considered significant for the objective demonstration of incontinence<sup>(16)</sup> be useful in the evaluation of patients with urinary incontinence include the use of voiding records. A voiding record, or a diary, is a tool to determine the frequency, timing, and amount of voiding. The patient is instructed to document each occurrence in the voiding diary for several days before starting the incontinence interventions. These records provide

clues to deciphering the underlying cause of patient's urinary incontinence, as well as setting a base line to evaluate the efficacy of interventions<sup>(12)</sup>.

There are many successful options for the control of urinary incontinence which include; nursing interventions in the form of behavioral therapy, pharmacological agents, and surgical treatment. The Agency for Health Care Policy and Research recommended that the initial management of choice for urinary incontinence is behavioral modification techniques, since they are least invasive, least expensive, most successful, and have no reported side effects<sup>(20)</sup>.

Behavioral techniques incorporate: bladder training and pelvic floor muscle exercises PFM (Kegel exercise)<sup>(20,21)</sup>. Bladder training is a voiding program that uses relaxation techniques (urge suppression technique) so; the patient can consciously inhibit the urge to void. Bladder training depends on patient education and voiding schedule<sup>(20)</sup>. It improves the urethral resistance through active contraction of the pubococcygeous muscles which exerts a closing force on the urethra and over time improves muscle support to the pelvic musculature<sup>(1)</sup>.

Pelvic floor muscle exercise action is improved using the electrical stimulation and biofeedback device. Electrical stimulation stimulates the pudendal nerve which causes pelvic floor and preurethral muscle contraction. Clinical results with the use of electrical stimulation are encouraging since it promotes a complete symptomatic relief and return of continence in the majority of patients<sup>(1,5)</sup>.

Biofeedback is an important milestone of pelvic muscle rehabilitation since it is used for teaching patients to isolate, contract, and relax the pelvic floor muscles, as well as it allows for evaluation of performance overtime. Moreover, biofeedback is a simple, non invasive, low risk, and provides the patient with a positive reward for accomplishing a control over the involuntary loss of urine<sup>(22)</sup>.

Nurses should play a leading role in preventing and managing urinary incontinence. Nursing research must be continued to explore and validate nursing interventions to identify the successful methods to control continence in patients with urinary incontinence.

The nurse has a responsibility to maintain and restore continence for every patient who needs medical and/or nursing management. This means adopting a positive role in bladder management to anticipate and prevent problems, not just managing incontinence when it occurs. Nursing management for the incontinent patients involved a combination of interventions, which necessitates cooperation from

members of the multidisciplinary team. Nursing management for the incontinent patients include: a logical sequence of assessment, planning, interventions, and evaluation of the outcomes<sup>(23)</sup>.

Nursing care of adults with urinary incontinence is an area of urologic nursing practice that continues to expand. In recent years, significant progress has been made toward professional and public education about the options and benefits of nursing interventions for urinary incontinence. In addition, there are increasingly opportunities for research, collaborative clinical practice, and direct nursing service to patients, families, and health care facilities. The urologic nurse, as a trained and experienced caregiver in matters associated with adult urinary incontinence, is a needed and valuable member of the health care team not only in our current system of health care delivery, but in the reformed health care delivery system of the future<sup>(24)</sup>.

In addition, nurses are important resources to incontinent patients in assisting with the selection and management of techniques. In addition, nurses are the health professionals who spend the most time with patients and can develop a trusting relationship with them. Nurses are coordinators of care, communicating with family, and members of the health care team. Moreover, the nurse may be the most cost- effective health care provider to deal with urinary incontinence<sup>(25)</sup>.

Managing the incontinent patient is an integral component of rehabilitation nursing practice, and it can be a very challenging and rewarding aspect of nursing care. Conclusively, nursing interventions for incontinent women can make the difference between continence and incontinence.

This study aims to determine the impact of nursing interventions on the control of urinary incontinence (stress, urge, and/or mixed) among adult female patients.

## 2. Materials and methods

Research Design:

A Quasi-Experimental Study

Materials:

Setting:

This study was conducted in the urodynamic out patient clinic at Alexandria Main University Hospital.

Subjects:

The subjects of the study consisted of 60 adult female patients. Subjects were selected according to the following criteria:

1. Married or widow women, aged 35-60 years.
2. Have stress, urge, or mixed urinary incontinence.

3. Have at least one episode of involuntary urine loss / week.

4. Functionally capable of independent toileting.

- Subjects were excluded if they had continual leakage, unstable angina, uncontrolled congestive heart failure, diabetes mellitus, or impaired mental status.

Tools of the study:

The following tools were developed or adapted by the researchers based on review of related literature.

Tool I: *Patient assessment sheet*, it consisted of four parts:

1. Demographic data

2. Patient's history which included:

- Characteristics of incontinence (onset, frequency, duration, precipitating circumstances, the amount of leakage, use of pads).

\*Frequency of incontinence was documented by using voiding record, which adapted from Pires (2002)<sup>(24)</sup>. It consisted initially of micturition schedule which established every 30 or 60 minutes based on the patient's base line day time voiding interval.- Incontinence time (day time, night time, both).

- Associated urinary symptoms (awareness of bladder fullness, ability to delay voiding, sensation of incomplete bladder emptying, dribbling after urination.)

- Relevant medications

3. Physical examination which include:

-Abdominal examination: To detect scars, distended bladder, or suprapubic tenderness.

-Vaginal examination: To assess skin condition, signs of infection, and pelvic floor muscle tone.

\*Vaginal digital test. It is adapted from Brink et al (1994) to evaluate pelvic floor muscle tone<sup>(54)</sup>. It included inserting a gloved and lubricated finger into the patient's vagina and asking the patient to squeeze around the examiner's finger to assess her ability to contract the muscle. After application of the test, pelvic floor muscle tone is identified according to the following scale:

0= No contraction.

1= Poor contraction (slight pressure).

2= good contraction (medium hard pressure for less than 5 seconds).

3= strong contraction (powerful pressure for more than 5 seconds)

4. Provocation test: it is adapted from Hahn et al (1993) to evaluate amount of leakage<sup>(26)</sup>. The test consisted of coughing vigorously for 5 times. During and after application of the test, leakage of urine is recorded according to scoring system as following:

0= No leakage.

1= Slight leakage. (a few drops of urine)

2= Moderate leakage during approximately first half of the test.

3= Severe leakage during the whole test

Tool II Evaluation Tool. It consisted of three items:

1. Voiding record: It was adapted from Pires (2002) to evaluate frequency of incontinence<sup>(12)</sup>

2. Provocation test. To evaluate amount of leakage<sup>(26)</sup>.

3. Pelvic floor muscle tone (vaginal digital test) is used to measure pelvic muscle tone after applying the nursing interventions<sup>(27)</sup>.

-Nursing interventions ( behavioral techniques ) it consisted of two areas:

1. Informational area:

a) The researchers illustrated simple view about anatomy and physiology of lower urinary tract, and causes of incontinence.

b) The researchers provided patients with instructions related to voiding schedule (it was scheduled every 30 or 60 minutes based on the patient's baseline, day time voiding intervals.

c) The researchers discussed information related to Kegel exercise. (Time of exercise, number, position, and muscle used for exercise)

2. Practical area it included:

a) Urge suppression technique (relaxation technique)<sup>(5, 7, and 28)</sup>. To regulate the intervals between voiding.)

b) Pelvic floor muscle exercise (Kegel exercise)<sup>(29, 30, 31)</sup>. To strengthen pelvic floor muscle

- Locating and identifying the pelvic floor muscle.

- Pelvic floor muscle training exercise.

c) Electrical stimulation (passive Kegel exercise)<sup>(32, 33, 34)</sup>. It included the use of a strong anal or vaginal continuous stimulation (maximum current up to 90 mA, maximum voltage 38v lasting 30 minutes /

session) to excite the pudendal nerve leading to direct and reflex contractions of the pelvic floor muscles.

d) Bladder sphincter biofeedback device<sup>(35,36,37)</sup>:

It included the use of surface electrodes on perineal skin, which help patients in recognizing the pelvic floor muscles.

Method:

Permission to carry out the study was obtained from the directors and the responsible specialist of the chosen setting after explaining the aim of the study. Tool (I), Tool (II), and the nursing interventions were developed and/or adapted by the researchers based on the review of relevant literature and were revised by 10 experts in the fields of urology and medical surgical nursing for their content validity. The nursing interventions were translated into Arabic language and revised by the same experts and the necessary modifications were done.

The researchers received a special training from the urologist about the use of the electrical stimulator, biofeedback device and performing the vaginal examination before starting the work field. Diagnosis and identifying treatment modalities was done by the urologist in the urodynamic clinic. Patients who met the selected criteria were referred to the researchers in the urodynamic clinic. At such time, aim of the study was clarified to patients and consent for participation was secured.

Application of a tool I, tool II and the nursing interventions to the selected patients was done. The application was arranged upon weekly clinic session for 6 consecutive weeks. Each session lasted approximately 30 to 60 minutes.

Statistical analysis:

After data were collected, they were coded and transferred into specially designed formats so as to be suitable for computer feeding. Following data entry, checking and verification processes were carried out to avoid any errors during data entry. Data was analyzed using PC with statistical package for social science version 13.0.

- The level of significance selected for this study was  $P \geq 0.05$ , and the following statistical measures were used:

A) Calculation of the percent improvement:

The percent improvement was calculated based on the formula

$$\frac{\text{Score before interventions} - \text{Score after interventions}}{\text{Score before interventions}} \times 100$$

B) Descriptive measures included: Count, percentage, arithmetic mean, and standard deviation, median.

C) Statistical tests included:

- Wilcoxon signed ranked test. It is non parametric test equivalent to t- test and is used to test the hypothesis that two related quantitative variables have the same distribution.
- Mc Nemar chi square test: Is used for assessing the effectiveness of a treatment or an experimental procedure from related samples pre interventions-post intervention difference.
- Kruskal wallis test It is a non-parametric test used for comparing two or more independent qualitative non-normally distributed valued.
- Spearman correlation coefficient test. It is non-parametric test used to measure the degree of association between qualitative values.

D) Graphical presentation included: Pie, Bar, and line graph using Microsoft Excel.

### 3. Results

Nearly half of patients (45%) were between 35 to less than 45 years old, and (48.3%) were illiterate. In addition, more than three quarter of the studied patients (80%) were not working, and (43.3%) of them had 3-5 times of gravida. (Table I)

The majority of patients (53.3%) didn't receive any medications (Fig. I), while (48.3%) of them had urinary incontinence for  $\geq 1$  year. Also, the majority of the studied patients (58.3%) had mixed urinary incontinence, and half of them (50%) had 1-2 episodes of incontinence/day. (Table II and III).

In relation to precipitating circumstances of incontinence, the findings of the present study revealed that the majority of the studied patients (58.3%) are influenced by both straining activities (laughing, coughing, sneezing); and exertional activities (exercise, positional changes, lifting); as well as stimulating activities (hand washing). In addition, the table showed that straining activities alone affect (10%) of the studied patients. On the other hand, the table illustrated that (11.7%) of the studied patients didn't affect by precipitating circumstances of incontinence. (Table IV)

In relation to wearing protective pads, this table showed that, (43.3%) of the studied patients wore protective pads, and almost third of them (33.3%) were changing two pads/24 hours. As regards the amount of leakage, the table also revealed that, more than three quarters of patients (80%) had damp pad ( $<0.5-7$  gm), while only (20%) of them had wet pad ( $<7-75$  gm). (Table V).

In relation to incontinence associated urinary symptoms, the table showed that the majority of the studied patients (95%) were aware of the act of incontinence and the majority of them (81.7%) were not able to delay voiding. In addition, two third of the studied patients (66.7%) had the sensation of incomplete bladder emptying after urination, and (60%) of them had been dribbling after urination, (Table VI).

As regards previous management for urinary incontinence, only (21.7%) of the studied patients practiced pelvic floor exercise, while the rest of them didn't receive any management for urinary incontinence as vaginal repair or estrogen cream. (Table VII)

Concerning abdominal examination, (15%) of the studied patients had previous scars of appendectomy, while (11.7%) of them had previous scars of cesarean section. The table also revealed that all patients had intact skin and no signs of vaginal infection (Table VIII).

As regards measuring pelvic floor muscle tone, three quarters of patients (75%) had good contractions, whereas (16.7%) of them had poor contractions, and only (8.3%) of patients had strong contractions. (Table IX)

In relation to weekly changes in incontinent episodes by patients over the period of interventions, the results of the present study showed that the reduction in incontinence episodes was most pronounced early in the second week and progressed more gradually thereafter. The mean  $\pm$  SD at the base line was (19.9 $\pm$ 12.9), while the mean  $\pm$  SD at the second week was (12.9 $\pm$ 11.8) and this was statistically significant ( $Z= 5.98$ ,  $P= 0.00$ ). Moreover, the table showed that the interventions appear to be effective in the majority of patients at the fourth week and have its greatest effect at the sixth week, since the mean  $\pm$  SD at the fourth week was (6.1 $\pm$ 8.2), while it was 3.9 $\pm$ 7.6 at sixth week. (Table X)

The majority of the studied patients (95%) were aware of the act of incontinence, and the majority of them (81.7%) were not able to delay voiding. 66.7% had the sensation of incomplete bladder emptying after urination, and 60% of them had been dribbling after urination.

The results of the present study showed that the mean percent improvement of incontinence episodes for patients who had 3-5 gravida was (76.1 $\pm$ 42.6), while it was (96.4 $\pm$ 0.0) for those who had 10 gravidas. According to Kruskal Wallis test, gravidity had no significant relationship with percent improvement of incontinence episodes ( $\chi^2= 0.502$ ,  $P= 0.918$ ). (Table XI)

It can be seen that the mean percent improvement of incontinence episodes for patients who had urinary incontinence for less than or equal one year was (92.6 $\pm$ 12.3), while it was (85.9 $\pm$ 32.5) for those who had urinary incontinence for 2 – 5 years. According to Kruskal Wallis test, duration of symptoms had no significant relationship with percent improvement of incontinence episodes ( $\chi^2= 1.202$ ,  $P= 0.548$ ). (Table XII)

The results also showed that there is a negative correlation between patient's age, and incontinence episodes, but there is no significant difference, after applying the nursing interventions. Moreover, the table showed that there is no significant correlation between the gravidity, and incontinence episodes. The table also showed that there is a positive significant correlation between duration of symptoms and incontinence episodes only before applying the nursing interventions, meaning that the longer the duration, the more incontinence episodes are encountered ( $r= 0.238$ ,  $p= 0.044$ ). The table revealed that there is a positive significant correlation between the amount of leakage and incontinence episodes after applying the nursing interventions ( $r=0.407$ ,  $p=0.001$ ) such that patients with the smallest amount of leakage before interventions had the fewest episodes of incontinence after interventions. (Table XIII)

As regards the amount of leakage, the mean  $\pm$  SD was (3.6  $\pm$  3.6) gm before applying the nursing interventions, while it was (0.3  $\pm$  1.2) after applying the nursing interventions. According to Wilcoxon signed rank test, there is a significant reduction in the amount of leakage after applying the nursing interventions ( $z= 6.74$ ,  $P= 0.00$ ). (Table XIV)

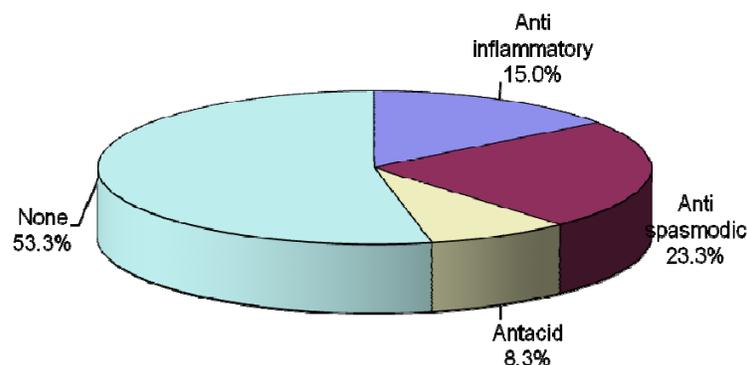
The results of this study demonstrated that the mean amount of leakage for patients who had 35  $\geq$  45 years old was (3.8  $\pm$  3.5) gm and (0.2  $\pm$  1) gm before and after applying the nursing interventions respectively. Furthermore, it can be seen that the mean amount of leakage for patients who suffered from urinary incontinence for 1>2 years was (1.6  $\pm$  0.5) gm and (0.0  $\pm$  0.0) gm before and after applying the nursing interventions respectively. In addition, the mean amount of leakage for those who experienced 10 gravidas was (8.1  $\pm$  0.8) gm and (0.0  $\pm$  0.0) gm before and after applying the nursing interventions respectively. According to Kruskal Wallis test, there is no statistical significant relationship between age and amount of leakage either before or after applying the nursing interventions. On the other hand, the table showed that there is a positive significant relationship between duration of symptoms and amount of leakage only before applying the nursing interventions, meaning that the longer the duration,

the larger the amount of leakage ( $\chi^2= 8.8$ ,  $P= 0.0124$ ). In addition, the table illustrated that there is a positive significant relationship between gravidity, and amount of leakage only before applying the nursing

interventions, such that the higher the number of gravida, the larger the amount of leakage ( $\chi^2= 14.8$ ,  $p= 0.0020$ ). (Table XV)

**Table (I) Distribution of the studied patients according to socio-demographic characteristics. (N=60)**

Characteristics of the studied patients	NO	Percent
Age		
35 > 45 years	27	45.0
45 > 55 years	20	35.0
55 $\geq$ 60 years	13	20.0
Education		
Illiterate	29	48.3
Read and write	23	38.3
Diploma	8	13.4
Bachelor degree	0	0.0
Occupation		
working:		
laborer	0	0.0
clerical	12	20.0
professional	0	0.0
not working ( house wife)	48	80.0
Marital statuses		
Married	51	85.0
Widow	9	15.0
Divorced	0	0.0
Number of gravida:		
$\geq 2$	7	11.7
3-5	26	43.3
6-9	24	40.0
10	3	5
Area of residence:		
Urban	43	71.7
Rural	17	28.3



**Fig (I) Distribution of the studied patients according to receiving relevant medications.**

**Table (II) Distribution of the studied patients according to duration and type of urinary incontinence (N=60)**

Characteristics of incontinence.	NO	Percent
Duration of incontinence		
≥ 1 year	29	48.3
< 1 > 2 years	6	10.0
2 - 5 years	25	41.7
Type of incontinence		
Urge	13	21.7
Stress	12	20.0
Mixed	35	58.3

**Table (III) Distribution of the studied patients according to time and frequency of urinary incontinence. (N=60)**

Characteristics of incontinence.	NO	Percent
Incontinence Time:		
Daytime	31	51.7
Both daytime & nighttime	29	48.3
Frequency:		
2 times /week	7	11.7
1-2 times / day	30	50.0
3-5 times /day	17	28.3
6-7 times /day	6	10.0
7-	0	0.0

**Table (IV) Distribution of the studied patients according to precipitating circumstances of incontinence. (N=60)**

Precipitating circumstances	NO(N=60)	Percent
Straining activities (laughing, coughing, sneezing)	6	10
Exertional activities (exercise, positional changes, lifting)	0	0.0
Stimulating activities ( Hand washing).	0	0.0
Both Straining and Exertional activities.	6	10
Both Straining & stimulating activities.	6	10
All (Straining, Exertional, and stimulating activities).	35	58.3
Non of the above.	7	11.7

**Table (V) Distribution of the studied patients according to wearing, changing protective pads / 24 hours, and the amount of leakage (difference in pad weight using provocation test)<sup>(26)</sup>. (N=60)**

	NO(N=60)	Percent
Wearing protective pads		
Yes	26	43.3
No	34	56.7
Frequency of changing pads /24 hours		
Once	6	10.0
Twice	20	33.3
Amount of leakage (difference in pad weight using provocation test)		
- Damp pad (<0.5 – 7 gm)	48	80.0
- Wet pad (< 7 – 75 gm)	12	20.0
- Saturating the outer clothing	0	0.0

Total number of patients = 60

**Table (VI) Distribution of the studied patients according to incontinence associated urinary symptoms. (N=60)**

Associated urinary symptoms	NO(N=60)	Percent
Awareness of the act of incontinence		
-Yes	57	95.0
- No	3	5.0
Ability to delay voiding:		
-Yes	11	18.3
- No	49	81.7
Sense of incomplete bladder emptying after voiding		
-Yes	40	66.7
- No	20	33.3
Dribbling after urination		
-Yes	36	60.0
- No	24	40.0

**Table (VII) Distribution of the studied patients according to previous management for urinary incontinence.**

Previous management for urinary incontinence	NO(N=60)	Percent
- Pelvic floor exercises	13	21.7
- Vaginal repair	0	0.0
- Estrogen cream	0	0.0
- Non	47	78.3
Total	60	100.0

**Table (VIII) Distribution of the studied patients in relation to physical examination before applying the nursing interventions. (N=60)**

+ Physical examination	No(N=60)	Percent
Abdominal examination:		
Presence of scars:		
Appendectomy	9	15
Cesarean section	7	11.7
Non	44	73.3
Skin condition:		
Intact	60	100.0
Break down	0	0.0
Signs of vaginal infection:		
present	0	0.0
not	60	100.0

**Table (IX) Distribution of the studied patients according to pelvic floor muscle tone using vaginal digital test (N=60)**

Muscle tone	NO(N=60)	Percent
* Poor contraction	10	16.7
** Good contraction	45	75.0
***Strong contraction	5	8.3
Total	60	100.0

\* Slight pressure.

\*\* Medium hard pressure for less than 5 seconds.

\*\*\* Strong contraction (powerful pressure for more than 5 seconds)<sup>(44)</sup>.

**Table (X) Mean, median and difference in pattern of weekly number of incontinent episodes during and after interventions. (N=60)**

Time/week	No	Mean $\pm$ SD	Median	Wilcoxon signed rank test	
				Z	P
<b>Baseline</b>	60	19.9 $\pm$ 12.9	14.0		
<b>Second</b>	60	12.9 $\pm$ 11.8	6.5	5.980	* 0.000
<b>Third</b>	60	9.4 $\pm$ 11.1	3.5	6.607	* 0.000
<b>Fourth</b>	60	6.1 $\pm$ 8.2	2.0	6.749	* 0.000
<b>Fifth</b>	60	4.5 $\pm$ 7.8	1.0	6.559	* 0.000
<b>Sixth</b>	60	3.9 $\pm$ 7.6	0.5	6.430	* 0.000
<b>After 8<sup>th</sup> weeks</b>	60	3.8 $\pm$ 7.7	0.0	6.445	* 0.000

- Significance are between the baseline and the above timing - Significance  $p \geq 0.05$

**Table (XI) Relationship between gravidity and percent improvement in incontinence episodes of the studied patients(N=60)**

Gravidity	No	Mean $\pm$ SD	Median	Kruskal Wallis test
$\geq 2$	7	94.0 $\pm$ 7.5	100.0	X <sup>2</sup> = 0.502 P = 0.918
3-5	26	76.1 $\pm$ 42.6	100.0	
6-9	24	92.0 $\pm$ 12.9	96.4	
10	3	96.4 $\pm$ 0.0	96.4	
<b>Total</b>	60	85.6 $\pm$ 30.2	100	

Significance  $p \geq 0.05$

Baseline value – Final value

Percent improvement = ----- x 100

Base line value

**Table (XII) Relationship between duration of symptoms and percent improvement in incontinence episodes of the studied patients.**

Duration of symptoms	No	Mean $\pm$ SD	Median	Kruskal Wallis test
$\geq 1$ year	29	92.6 $\pm$ 12.3	100.0	X <sup>2</sup> = 1.202 P = 0.548
<1> 2 years	6	50.0 $\pm$ 54.8	50.0	
2 - 5 years	25	85.9 $\pm$ 32.5	100.0	
<b>Total</b>	60	85.6 $\pm$ 30.2	100.0	

Significance  $p \geq 0.05$

Baseline value – Final value

Percent improvement = ----- x 100

Base line value

**Table (XIII) Spearman Correlation coefficients between patients' age, gravidity, duration of symptoms, amount of leakage and incontinence episodes.**

Items	incontinence episodes	
	Before interventions	After interventions
Age	r= 0.1878 p=0.151	r= -0.0703 p=0.594
Gravidity	r= 0.1847 p=0.158	r= 0.1567 p=0.232
Duration of symptoms	r= 0.2389 p=0.044*	r= 0.2398 p=0.065
Amount of leakage	r= 0.4468 p=0.000*	r= 0.4078 p=0.001*

Significance  $p \geq 0.05$ **Table (XIV) Mean, median and difference of the studied patients according to amount of leakage before and after applying the nursing interventions. (N=60)**

Amount of leakage	No	Mean $\pm$ SD	Median	Wilcoxon signed rank test
Before interventions	60	3.6 $\pm$ 3.6	1.9	Z = 6.74 P = 0.000*
After interventions	60	0.3 $\pm$ 1.2	0.0	
Total	60	97.5 $\pm$ 10.8	100.0	

Significance  $p \geq 0.05$ **Table (XV) Relationship between patients' age, gravidity, duration of symptoms and amount of leakage.**

	No	Amount of leakage		Kruskal wallis test	
		Mean $\pm$ SD		Before	After
		Before	After	Before	After
Age					
35-	27	3.8 $\pm$ 3.5	0.2 $\pm$ 1	X <sup>2</sup> = 2.4 P=0.3013	X <sup>2</sup> =1.3 P= 0.5101
45-	20	3.2 $\pm$ 3.5	0.5 $\pm$ 1.64		
55-60	13	3.6 $\pm$ 4.2	0.0 $\pm$ 0.0		
Total	60	3.6 $\pm$ 3.6	0.3 $\pm$ 1.2		
Duration of symptoms					
$\geq$ 1 year	29	3.7 $\pm$ 4.6	0.6 $\pm$ 1.6	X <sup>2</sup> = 8.8 P=0.0124*	X <sup>2</sup> =4.5 P= 0.1055
<1>2 years	6	1.6 $\pm$ 0.5	0.0 $\pm$ 0.0		
2 -5 years	25	3.8 $\pm$ 2.4	0.0 $\pm$ 0.0		
Total	60	3.6 $\pm$ 3.6	0.3 $\pm$ 1.2		
Gravidity					
$\geq$ 2	7	7.4 $\pm$ 6.3	0.04 $\pm$ 0.11	X <sup>2</sup> = 14.8 P=0.0020*	X <sup>2</sup> =3.9 P= 0.2677
3- 5	26	2.2 $\pm$ 1.5	0.0 $\pm$ 0.0		
6- 9	24	3.4 $\pm$ 3.3	0.65 $\pm$ 1.8		
10	3	8.1 $\pm$ 0.8	0.0 $\pm$ 0.0		
Total	60	3.6 $\pm$ 3.6	0.3 $\pm$ 1.2		

Significance  $p \geq 0.05$

#### 4. Discussion

Concerning the effect of applying the nursing interventions on percent reduction in incontinence episodes of the studied patients, the findings of the present study showed that more than half of the studied patients achieved complete cure, while more than third of them showed apparent improvement, since they achieved (50 > 100%) reduction in incontinence episodes as compared with the base line.

The previous finding is in agreement with Seidel<sup>(38)</sup> who mentioned that the National Association For Continence reported that a proximately 80% of incontinent patients can be cured or improved. In this context, Pires<sup>(12)</sup>, and Burgio et al<sup>(39)</sup> found that there were a significant cure rates, and reduction of incontinence episodes in patients who received behavioral interventions and electrical stimulation in conjunction with the biofeedback device, since they had a better attendance.

The finding also revealed that (10%) of patients failed to respond to the interventions because they said that they didn't perform the exercise conscientiously at home, and so may be considered patient rather than method failure. In this context, 10.

Nygard<sup>(10)</sup>, and Goode et al<sup>(40)</sup> mentioned that the use of home trainers could increase adherence, which may improve intervention efficacy. In addition, Roe et al<sup>(41)</sup> found that among cognitively intact individuals, a nurse practitioner who administered home based behavioral therapy program that combined bladder training, pelvic floor exercise with the aid of the electrical stimulation and biofeedback device was significantly better than regular clinic visits by a nurse practitioner.

In respect to correlation between duration of symptoms and percent improvement of incontinence episodes, the finding of this study illustrated that the mean percent improvement of incontinence episodes for patients who had urinary incontinence for = year was (92.6 d 12.3). Moreover, the results of the study proved that there was no significant relationship between duration of symptoms and percent improvement of incontinence episodes after applying the nursing interventions ( $\chi^2 = 1.202$ ,  $p = 0.548$ ). On the other hand, the previous finding is in contrast with Henalla et al<sup>(31)</sup> who found that the interventions were more effective with a shorter duration of symptoms (=1 year) ( $P = 0.05$ ).

As regards weekly changes in incontinence episodes, as compared with the base line, of patients over the period of interventions, the finding of this study illustrated that the reduction in incontinence

episodes was most pronounced early in the second week and progressed more gradually thereafter. The mean  $\pm$  SD at the base line was ( $19.9 \pm 12.9$ ), while the mean  $\pm$  SD at the second week was ( $12.1 \pm 11.8$ ) and this was statistically significant ( $z = 5.98$ ,  $p = 0.00$ ).

Moreover, the finding showed that the nursing interventions appear to be effective for the majority of patients at the fourth week and had its greatest effect at the sixth week. Furthermore, the studied patients could maintain their -improvement during the evaluation period, since there was a significant reduction in incontinence frequency after interventions as compared with frequency during base line ( $Z = 6.445$ ,  $p = 0.00$ ). More simply, this could be explained by fear of leakage following interventions, as patients often compensate for incontinence by frequent voiding in order to keep their bladder empty.

The previous finding is consistent with Wyman et al<sup>(43)</sup> who used a six week intervention program for incontinent patients, including behavioral interventions and electrical stimulation in conjunction with the use of the biofeedback device. They found that the interventions became effective after 4-6 weeks of implementation. They clarified that the higher attendance rate at scheduled interventions visits gave patients greater interaction with the researcher and attention to their problem and thus could have led to initial differences.

In relation to measuring pelvic floor muscle's tone using vaginal digital test, the results of the present study revealed that (16.7 %) of patients had a poor contraction before interventions, while half of them had a strong contraction after applying the nursing interventions. In this regard, Fitz Gerald et al<sup>(44)</sup> reported that the nurse researchers have recognized the value of vaginal digital test in measuring pelvic floor muscle strength, and in evaluating the effectiveness of the nursing interventions in clinical settings.

Correlation analysis proved that there was the significant improvement in pelvic floor muscle's tone after applying the nursing interventions ( $\chi^2 = 28.0$ ,  $p = 0.00$ ). In addition, the mean percent improvement in pelvic floor muscle's tone was 38.8%. The previous finding is in line with Flecher<sup>(21)</sup>, Gray & David<sup>(22)</sup> who mentioned that performing Kegel exercises regularly for 4-6 weeks helps to improve urethral resistance through active contraction of the pubococcygeus muscle which exerts a closing force on the urethra and overtime improves muscle support to the pelvic structures and strengthens the voluntary pen-urethral and pelvic

musculature. Moreover, strengthening the pelvic floor muscles helps to support the bladder, decreases frequency and urgency of urination.

As regards the correlation link between patient's age and incontinence episodes, the finding of this study indicated that there was a negative correlation between patients' age and incontinence episodes after applying the nursing interventions, but this correlation was not significant. On the same line, Seidel<sup>(23)</sup> found that patient's age was unrelated to percent improvement in incontinence episodes. On the other hand, the previous finding is in contrast with Slevin<sup>(25)</sup> who found that patients' age was statistically correlated to incontinence episodes. In addition, she mentioned that the higher the age, the more the problem is encountered especially in post menopausal women due to hypoestrogenism which causes atrophy of vaginal tissues, resulting in friability, inflammation, susceptibility to infection and weakened pelvic floor muscles.

Concerning gravidity, the results of the study showed that, more than third of the studied patients had 6- 9 gravidas. Also, the finding revealed that the mean percent improvement of incontinence episodes for patients who had 3 -5 gravida was (76.1 ± 42.6), while it was (96.4 ± 0.0) for those who had 10 gravidas. In addition, correlation analysis indicated that gravidity had no significant relationship with percent improvement in incontinence episodes after applying the nursing interventions ( $X^2=0.502$ ,  $P=0.918$ ).

The previous finding is in accordance with Wyman<sup>(43)</sup> who found that there was no significant relationship between gravidity and percent improvement in incontinence episodes. On the other hand, Contillo<sup>(3)</sup> and Palkhivala<sup>(7)</sup> documented that women suffer from urinary incontinence four times more than men due to multiple trauma from child birth who affects urethral sphincter function.

In respect to duration of urinary incontinence, the finding revealed that more than third of the studied patients were suffering from urinary incontinence for two to five years, and more than three quarter of the studied patients didn't search for treatment. This may be due to the poor educational level of the studied patients, since the majority of them were illiterate, or just could read and write. Moreover, it may be related to the embarrassing nature of incontinence, which could prevent them from work since more than three quarters of the studied patients were not working. The long distance from health services and the high cost of transportation may have an effect, since the majority of the studied patients were from urban

areas, whereas less than third of them was from rural areas.

The previous finding is in line with Straus, et al<sup>(17)</sup> who stated that sufferers often prefer to conceal the problem for as long as possible, and go to extreme lengths to hide it even from family members. Moreover, Contillo<sup>(3)</sup> reported that, on average, women wait 5-6 years from the first time they experience symptoms until they obtain a diagnosis for their bladder control problems. Additionally, Palkhivala<sup>(7)</sup> stated that urinary incontinence has a great impact on quality of life, and it is a common cause of dependent lifestyle.

In this field, Nygard<sup>(10)</sup> mentioned that up to 70% of patients with urinary incontinence don't seek help for their problem. This is due to several factors, including embarrassment, unawareness that help is available; under recognition as a significant clinical problem by health care providers; lack of orientation of health providers regarding new research findings; inadequate staffing in the long-term-care setting; and the persistent major gaps in our understanding of the natural history, pathophysiology, and most effective treatments of the common forms of urinary incontinence.

Regarding the relationship between receiving sonic medications and urinary incontinence, the finding of the present study showed that the majority of the studied patients didn't receive any medications, while the rest of them received antispasmodics, anti-inflammatory and antacids. In this context, Seidel<sup>(23)</sup> mentioned that these drugs often have side effects as confusion, or sedation, which leads to an inability to urinate properly, and unawareness of toileting needs. However, Abdel Aziz<sup>(45)</sup> contradicted these findings and reported that there is no significant association between urinary incontinence and medications. Moreover, But<sup>(46)</sup> studied the relationship between medications and urinary incontinence retrospectively for 128 incontinent patients, and found that patients were taking up to 18 medications but most of these patients, were unlikely to have a significant urological defect.

The results also indicated that the majority of the studied patients were influenced by precipitating circumstances of incontinence, as laughing, coughing, sneezing, exercise, positional changes, lifting heavy object, and hand washing. This finding was not surprising, since the majority of the studied patients had mixed urinary incontinence. The previous finding is in contrast with Burgio<sup>(39)</sup> who stated that mixed urinary incontinence, defined as the combination of stress and urge incontinence,

accounts for approximately 33% of all cases of incontinence in women.

Regarding to some intervening factors related to urinary incontinence, it wasn't surprising that all patients had intact skin and no signs of vaginal infection, since free from infection was a subject criterion to be included in this study. In this regard, Leduc and Straus et al <sup>(17)</sup> mentioned that recurrent urinary tract infection appears to be independently associated with urinary incontinence.

In relation to using protective means for women with urinary incontinence, the results showed that nearly half of the studied patients wore protective pads, third of them were changing two pads/24 hours. In this context, Seidel <sup>(38)</sup> reported that, two third of women experiencing urinary incontinence do not use any product to manage their incontinence.

As regards measuring the amount of leakage using provocation test, the finding of the present study revealed that the mean amount of leakage was  $(3.6 \pm 3.6)$  gm and  $(0.3 \pm 1.2)$  gm before and after applying the nursing interventions respectively, and this was statistically significant ( $z = 6.74$ ,  $p = 0.00$ ). In this field, Fitz et al <sup>(44)</sup> reported that the use of behavioral interventions in combination with electrical stimulation is most effective in patients with mild urine loss.

Additionally, the results revealed that there was a significant correlation between the amount of leakage and incontinence episodes after applying the nursing interventions ( $r=0.4078$ ,  $p=0.001$ ) such that patients with the smallest amount of leakage before interventions also had the fewest episodes of incontinence after interventions. Similar were obtained by Palkhivala <sup>(7)</sup> who found that the smaller the loss, the greater improvement in incontinence episodes. Also, the results demonstrated that patients' age, duration of symptoms, and gravidity were unrelated to amount of leakage after ring the nursing interventions. The previous results are in contrast with Palkhivala <sup>(7)</sup> who found that the amount of loss after interventions was age- linked, meaning that older had smaller losses.

However, the previous results are promising for women suffering from urinary incontinence, since the cure could be achieved at any age, regardless duration of symptoms or gravidity. Moreover, these results could be used to develop strategies to change attitudes toward urinary incontinence and to improve continence care.

In an environment where continence should compete with organ transplantation and gene therapy, nurses are challenged as never before to identify the

successful methods to control continence in patients with urinary incontinence, so nurses must be more creative, inventive, and bold in developing new approaches to prevent and manage urinary incontinence.<sup>(25)</sup>

Furthermore, urological nursing has a vital role to play in the promotion of continence. This role extends across the dimensions of research-based practice, education, training, development and implementation of high quality practice<sup>(25,33)</sup>. In addition, one of the prevalent roles of nurses is teaching patients to maintain optimal health, to prevent complications, and to assist patients in the restoration of normal functions. Accordingly, nurses are important resources to incontinent patients in assisting with the selection and management of techniques. They are coordinators of care, communicating with family, and members of the health care team. Moreover, nurses may be the most cost- effective health care provider to deal with urinary incontinence<sup>(29)</sup>.

## 5. Conclusion and Recommendations

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. The initial management of choice for urinary incontinence is behavioral modification techniques, since they are least invasive, least expensive, most successful, and have no reported side effects. Behavioral techniques incorporate bladder training, and pelvic floor exercise. They are enhanced using the electrical stimulation, and biofeedback device. It can be concluded from the present study that the impact of nursing interventions on the control of urinary incontinence among the studied patients was satisfactory in respect to the significant reduction in incontinence episodes, the significant reduction in the amount of leakage, and the significant improvement in pelvic floor muscle tone after applying the nursing interventions. This could be related to the determination of the patients to practice the exercise regularly, the remarkable nursing support, and the outstanding equipment.

From the ongoing conclusion, the following recommendations are forwarded:

- Randomized clinical trials, including comparison between specific behavioral management (Kegel exercise, urge suppression technique, electrical stimulation, and biofeedback device) either alone or in combination.

- Epidemiologic studies with emphasis on the incidence, prevalence of urinary incontinence in Egypt.
- Develop nursing care standards for incontinent patients.
- Provide ongoing in-service education for nurses to update their knowledge related to take care oftaking care incontinent patients.
- Integrate nursing researches, theories and concept into the practice environment.
- Provide accurate information in the newspaper, magazine articles, radio, television programs, and special educational programs in senior centers.
- Develop a manual booklet with simple instructions and illustrations, which can be used as a teaching aid for incontinent patients.

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