

Effect of Kegel Exercises on Female Stress Urinary Incontinence Outcome

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Abstract: Stress urinary incontinence (SUI) is the involuntary leakage of urine on exertion struggle, sneezing, or coughing” by the International Continence Society, is the foremost common sort of urinary incontinence in women. In spite of the fact that it isn't a life-threatening condition, SUI affects women’s social and personal relationships, as well as limiting physical activity. Conservative treatment is now acclaimed as first-line treatment in women with mild and moderate symptoms. Conservative treatments, a nonsurgical treatment, include Kegel exercises which are the most prevalent strategy of strengthening pelvic floor muscles and are noninvasive treatment .They are the most cost-effective treatment. The aim of this study was to explore the effect of kegel exercises on female stress urinary incontinence outcome. Methods: sixty patients with SUI were selected and randomly divided into study group and control group. Patients in the study group received kegel exercises, while those in the control group didn't receive any intervention. Follow-up was continued for 3 months after intervention. Results: the study revealed that there was significant effects on the study group related to the effect of kegels' exercise training on female urinary incontinence patients' signs and symptoms including decreasing urine leaking while coughing, sneezing, bending down, bracing something up walks hastily, shaking or exercise, decreasing urine running down legs onto floor, decrease using pads and expand sexual life. Also there was a significant influence on the study group patients' daily activities, physical activities, social activities and emotional wellbeing. Conclusion: Kegel exercises for female SUI patients have significant improvement in outcome criteria of urinary incontinence.

Keywords: Kegel exercise, stress urinary incontinence, outcome

Introduction

Urinary incontinence is the involuntary passage of urine occurs when the urinary bladder pressure exceeds the entire urethral resistance. Urinary incontinence is a common problem that influences numerous people. According to the American Urological Association, 25% to 35% of men and women in the United States endure from urinary incontinence. Urinary incontinence is more predominance among women than men. An estimated 30% of females aged from 30-60 years are thought to suffer from it, compared to 1.5-5 % of men. **El-Azab, Mohamed and Sabra (2007)** who studied the incidence and risk factors of urinary incontinence and its effect on the quality of life between Egyptian women stated that urinary

incontinence is common in Egypt and prevalence rates are higher. SUI is a common problem experienced by various women. It can have a significant undesirable effect on the quality of life of patient and possibly on those friends and family members whose survives and activities may also be constrained. SUI as its name suggests, alludes to an intense increment in intraperitoneal pressure, causing involuntary urination due to the misfortune of contraction of the detrusor muscle (**Ford, Rogerson, Cody, Aluko and Ogah 2017; Townsend,2007**). In spite of the fact that the cause of destitute urethral function in the stress-incontinent woman is not totally caught on, identifiable risk factors for the condition incorporate pregnancy, vaginal deliveries, menopause, obesity , cognitive impairment, decreased estrogen levels allied with menopause, and surgery involving the lower abdominal area. There are two common, often overlapping, mechanisms for stress urinary incontinence have been described urethral hypermobility coming about from loss of support of the bladder neck and urethra (such that they move through peaks of abdominal pressure), and softness of the urinary sphincter itself. If the urinary sphincter mechanism is damaged, a specific subtype of stress urinary incontinence ensues sometimes denoted to as intrinsic sphincter deficiency. Weakness of the urinary sphincter can result from trauma, repeated urogynaecological surgeries, neurological disease, ageing or diseases alluded to systemic muscular atrophy. Although all current treatments are used for both subtypes of stress urinary incontinence, in general, treatments are more efficacious for patients with some degree of urethral hypermobility than for insulated weakness of the urinary sphincter (**Kang, Kim and Kim 2012**).

Although the fact that surgical management is the more viable and well known treatment for Urinary incontinence but it performed only when the patient choose that existing management is ineffectual (**Daneshgari 2010**). Conservative treatment is currently recommended as first-line intervention in those with mild and moderate symptoms. It includes improving the lifestyle, behavioral therapy, Kegel exercises, bladder training, biofeedback, and the electrical stimulation of pelvic muscles. Pelvic floor muscle exercises are foremost successful strategy for steadily strengthening pelvic floor muscles, are the most cost-effective intervention and minimize invasiveness as they don't require the arrangement of any vaginal weights/cones (**Pereira, Melo, Correia, and Driusso 2012**) Kegel exercises were first described nearly 50 years ago by the American gynecologist a nold Kegel. They vary from other treatments in that the patients can perform them by themselves anytime, anyplace, whereas doing other work, and without steady hospital visits. The patients only need to be educated and competent in how to contract their pelvic floor muscles (**Abrams, Andersson and Birder 2010**).

The nurse plays a vital part in training the patient in how to contract their pelvic floor muscles. Some studies show that Kegel exercises gradually strength the pelvic muscles, others researches particularized that patient's results vary depending on whether they exercise their pelvic floor muscles after accurate determination of them, how they perform exercise in a regular schedule, and how much they believe in the exercises themselves. Moreover, several studies have conveyed effect pelvic floor muscles exercises on the female urinary incontinence with stress, urge, and mixed UI or have managed with all nonsurgical treatment including

drugs. Various systematic reviews appeared that most studies have examined the viability and durability of Kegel exercises on urinary incontinence detailed conflicting results. **(Latthe, Foon, and Khan 2008 , Ministry of Health 2003).**

According to National Institute of Health pelvic floor muscle exercise fortifies the voluntary peri-urethral and pelvic floor muscles, the compression of which exerts a closing force on the urethra. This strategy has been emphasized for ladies with SUI but appears to be valuable in men as well. Benefit has been reported in 30 to 90% of women, but criteria differ between studies. Patients with mild symptoms may expand most. Continued exercise is required for continued benefit **(Mørkved, Frawley, and Sherburn 2009, Yoo 2006).**

Pelvic floor muscle exercise includes "drawing in" or "lifting up" peri-vaginal muscles or anal sphincter as if to control voiding with negligible contraction of abdominal, buttock or inner thigh muscles **(Fantl, Newman. and Colling 2019).** Pelvic floor muscle exercise improves other therapies including insertion of vaginal cones, electrical stimulation and behavioural training, and decrease severity of urinary incontinence in adults females **(Hay-Smith, Berghmans and Hendriks 2015, Willy and Miroslav 2011).** Therefore, to supply exact accurate results one nursing intervention need to be appraised on one type of urinary incontinence with veneration to actual practice. So, the present study aims to evaluate the effect of Kegel exercises on the management of female stress urinary incontinence.

Aim of the study:

This study aimed to:

- Study the effect of kegel exercises on female stress urinary incontinence outcome
- **Research hypothesis:**
- Females' patients who perform Kegel exercises will experience improvement in stress urinary incontinence outcome than those who do not perform such exercises.
- **Operational definition of stress urinary incontinence outcome:** it includes subjective measures including stress urinary incontinence symptoms related to leak urine when cough or sneeze, bend down or lift something up, walk quickly, jog or exercise, leaking urine and run down legs onto floor, using pads and sex life affected by urine leakage. Also evaluates the effect of stress urinary incontinence on daily activities, physical activities, social activities and emotional wellbeing.

MATERIALS AND METHOD

Materials

Research design:

Quasi-experimental design was used.

Settings:

This study will be conducted at urological clinic of the One day treatment center, Alexandria Main University Hospital, Egypt.

Subjects:

- A convenience sample of 60 adult females diagnosed with stress urinary incontinence and attend to the above mentioned settings.

Epi info 7 was used to estimate the sample size using the following parameters:

- Population size: 70/ 3 months.
- Confidence level: 95%
- Margin of error: 5%
- Prevalence rate: 50%
- Minimum sample size: 60 patients.

Subjects, inclusion criteria were:

Patients were considered eligible to participate in the study if they met the following inclusion criteria:

1. Age group from 18 up to 60 years old.
2. Able to communicate verbally, could understand and comply with study procedures.
3. willing to complete written informed consent
4. They must have stress urinary incontinence

Exclusion criteria

1. urinary incontinence other than SUI
2. prior surgery for SUI
3. current urinary tract infection at screening or a positive history of frequent, recurrent urinary tract infections
4. prominent uterovaginal prolapse
5. morbid obesity
6. neurological or significant psychiatric disease
7. current pregnancy or a history of delivery within 12 weeks prior to enrollment
8. current or prior use of a pelvic floor muscle stimulator
9. Previous sessions of physiotherapy in the last 6 months.
10. history of colorectal, cervical vaginal or ovarian cancer

Tools:

Three tools were used for data collection:

Tool I: Socio demographic and clinical data: including age, educational level, marital status, living, employment status, residence and current prescribed medication.

Tool II: Urinary Incontinence Questionnaire:

This tool was developed by the researchers based on review of relevant recent literature (**Catherine, David, Ingrid, Matthew, Charles, Kimberly, Nazema and Robert 2010, Hills and Jackson 2019 and Upadhyay 2019**) to assess female urinary incontinence. It included 6 items related to leak urine when cough or sneeze, bend down or lift something up, walk quickly, jog or exercise, leaking

urine and run down legs onto floor, using pads and sex life affected by urine leakage. It was assessed on 6 point rating scale ranging from (0) = None of the time, (1) = Rarely, (2) = Once in a while, (3) = Often, (4) = Most of the time or (5) = All of the time.

Tool II: Multidimensional Urinary Incontinence Scale:

This tool was adapted by the researcher using the King's Health Questionnaire (**Brazier, Czoski-Murray and Roberts 2007**). It aims to assess urinary incontinence related to 4 dimensions daily activities, physical, social and emotional. Daily activities dimension include 2 items related to household tasks and job or normal daily activities outside the home. Physical dimension include 2 items related to physical activities (e.g. walking, running, sport, gym etc) and ability to engage in kind of enjoyable activities. Social dimension include 3 items related to ability to travel, social life and ability to see and visit friends. Emotional dimension include 3 items related to feel depressed, feel anxious or nervous and feel bad about yourself. It was assessed on 4 point rating scale ranging from (1) = Not at all, (2) = Slightly, (3) = Moderately, (4) = A lot.

Method

The study was accomplished as follows:

1- Written approval

- An ethical approval was taken from the Ethical Committee of Faculty of Nursing, Alexandria University for carrying out this study.

An official letter was sent from the Faculty of Nursing, Alexandria University to responsible authorities at Urological Department at Alexandria Main University Hospital (MUH) to take permission to conduct the study after explanation of its purpose.

2- Tool development

Tool I and Tool II were developed by the researcher after reviewing the relevant literature (**Catherine 2010, Hills 2019 and Upadhyay 2019**) and Tool III was adapted by the researcher using the King's Health Questionnaire (**Brazier et al.; 2007**).

3- Content validity

The developed tools were tested for its content validity by 5 faculty members who are experts in the field of medical surgical nursing, Faculty of Nursing, University of Alexandria to assure the content validity and clarity of items.

4- Reliability

Study tool was tested for its reliability using Alpha Cronbach's statistical test for internal consistency of tools items. The reliability coefficient was 0 .820 which is acceptable.

5-A pilot study

A pilot study was carried out before starting the data collection. It was applied on 6 nurses to test clarity, feasibility and applicability of the developed tool. They were excluded from the total sample, and no modifications were done.

6- Data collection

- From all patients who met the predetermined inclusion criteria, the patients were recruited using a convenience sampling technique.
- The study subjects was divided randomly into two equal groups; control and study group (30 for each group), the control group will be exposed to routine medical treatment. The data will be collected from the control group first then from the study group to prevent theoretical contamination of the study group.
 - the study group will receive both medical treatment and nursing interventions for Kegel exercises. Each participant took part in the following training and taught about: the anatomy of the pelvic floor and lower urinary tract, physiology, continence mechanisms by the researchers, all were taught to contract the pelvic floor muscles correctly. The researchers instructed the participants to contract the pelvic floor muscles for 10 seconds and relax it 10 seconds and repeat 10 times and repeat this session 3-4 times per day at home. All participants were followed up three times daily by telephone, to confirm performing of Kegel Exercises. The researchers planned additional training in groups once a week for 45 minutes. Kegel Exercises carried out by the participants in any position supine, sitting, and standing positions and at any time except during urination. The training program was continued for 12 weeks. The subjects fill the assessment sheet before, 6weeks after the intervention and 12 weeks after the intervention. Data collection was conducted over a period of 9months (from Jauniary 2018 to September 2018).

7- Ethical considerations

- The anonymity and confidentiality of nurses' responses and privacy have been asserted.

8- Statistical analysis of the data

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0.(Armonk, NY: IBM Corp) Qualitative data were described using number and percent. Quantitative data were described using range (minimum and maximum), mean, standard deviation. Significance of the obtained results was judged at the 5% level:

- Paired t-test

For normally distributed quantitative variables, to compare between two periods

- Chi-square test

For categorical variables, to compare between different groups

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Results

Table (1) frequency distribution of socio-demographic characteristics among the study and control groups of female patients with stress urinary incontinence. It covers socio-demographic characteristics, including age, marital status, educational level, living, employment status, residence, duration of urinary incontinence in years and current prescribed medication. It was found that more than half of the studied patients in both groups (study and control groups) (60%) were in age group less than 50 years old (47.40 ± 8.500) (46.27 ± 8.558). For their level of education, less than one third of the studied patients (30%) had secondary certificate and only 16.7%, 6.7% both groups (study and control groups) had a bachelor degree. While regarding marital status, more than half of the both groups (study and control groups) were married. For their area of living more than half of the both groups live with others (66.7%, 76.7%). Concerning employment status more than two thirds of both groups were not working .While more than half of both groups were live in urban area. In relation to duration of urinary

incontinence in years was in average of (4.8 ± 1.1) and (4.2 ± 0.9) in the study and control group respectively. The result also revealed that 50.0%, 36.7% of the both studied groups had Anti-muscarinic as Current prescribed medication only while 16.7%, 23.3% of the both studied groups had Beta-3 agonist and 33.3%, 40.0% of the both studied groups had both of them as a current prescribed medication. There was no statistical significant difference between the study and control group regarding all items of socio-demographic characteristics.

Table (II): shows comparison between the study and the control groups related to effect of kegels' exercise training on female stress urinary incontinence signs and symptoms. It was found that 66.7% and 80% of study and control groups respectively complained from leaking urine when cough or sneeze all of the time before application of the training program while this percent decreased in patient in the study group after 6 and 12 weeks of kegel exercises $P= 0.016$ and 0.000 respectively.

It was noticed that more than half of the studied patients in both groups (study and control groups) complained from leaking urine when she walks quickly, jogs or exercise before application of the training program while this percent decreased in patient in the study group to 16.7% , 0 % after 6 and 12 weeks of kegel exercises respectively. While regarding patient feeling of Leaking urine when she bends down or lifts something up and leaking urine and running down legs onto floor It was found that there were a highly statistical significant differences between both groups (study and control) after 6 and 12 weeks of kegel exercises respectively $P=0.000$.

As for using pads , it was noticed that more than half of the studied patients in both groups (study and control groups) using pads while this percent decreased in patient in the study group to 0% after 6 and 12 weeks of kegel exercises respectively.

It was observed that more than three quarter of the studied patients in both groups (study and control groups) feel that her sex life has been affected by urine leakage while this percent decreased in patient in the study group to 0% after 6 and 12 weeks of kegel exercises respectively, with a highly statistical differences $P=0.000^*$.

Table (III): comparison between the study and the control groups related to effect of kegels' exercise training on patients' daily activities, physical activities, social activities and emotional wellbeing. As Household tasks , job, or normal daily activities outside the home and ability to travel , it was noticed that near than half of the studied patients in both groups (study and control groups) complained from limitation in these activities, while this percent decreased in patient in the study group to 0% after 6 and 12 weeks of kegel exercises respectively.

It was found that more than one third of the studied patients in both groups (study and control groups) complained from limitation in Physical activities (e.g. going for a walk, running, sport, gym etc), social life before application of the training program while this percent decreased in patient in the study group to 0% after 6 and 12 weeks of kegel exercises respectively.

As for the ability to engage in kind of enjoyable activities, it was noticed that more than half of the studied patients in both groups (study and control groups) complained from limitation to engage in kind of enjoyable activities, while this percent decreased in patient in the study group to 0% after 6 and 12 weeks of kegel exercises respectively. Regarding ability to see and visit friends it was noticed that one third of the studied patients in both groups (study and control groups) complained from limitation to see and visit friends, while this percent decreased in patient in the study group to 3.3% and 0% after 6 and 12 weeks of kegel exercises respectively with a highly statistical differences $P=0.000^*$.

Table (I): Frequency Distribution of Socio-Demographic Characteristics among the Study and Control Groups of Female Patients with Stress Urinary Incontinence.

Socio-Demographic Characteristics	Study group (n=30)		Control group (n=30)		Significance level
	No.	%	No.	%	
Age (Years)	47.40± 8.500		46.27± 8.558		t= 0.515 P= 0.986
Educational level					
Illiterate/Read and write	4	13.3%	5	16.7%	$\chi^2=2.860$ P=0.582
Primary	7	23.3%	6	20.0%	
Secondary	10	33.3%	9	30.0%	
Diploma	4	13.3%	8	26.7%	
Highly educated	5	16.7%	2	6.7%	
Marital Status					
Married	21	70.0%	16	53.3%	$\chi^2= 1.827$ P=0.401
divorced	4	13.3%	7	23.3%	
Widow	5	16.7%	7	23.3%	
Living					
Alone	7	23.3%	10	33.3%	$\chi^2=0.739$ P=0.390
With others	23	76.7%	20	66.7%	
Employment status					
Not working	21	70.0%	20	66.7%	$\chi^2=1.091$ P=0.580
Own work	1	3.3%	3	10.0%	
Clerical	8	26.7%	7	23.3%	
Residence					
Urban	20	66.7%	17	56.7%	$\chi^2= 0.635$ P=0.426
Rural	10	33.3%	13	6.7%	
duration of urinary incontinence					
Duration (years)	4.8±1.1		4.2±0.9		t=0.125 (0.901)
Current prescribed medication					
Antimuscarinic	15	50.0%	11	36.7%	$\chi^2=1.131$ P=0.568
Beta-3 agonist	5	16.7%	7	23.3%	
Antimuscarinic and Beta-3agonist	10	33.3%	12	40.0%	

 χ^2 : Chi square test

t: t-test

 p: p value for association between different categories * Statistically significant at $p \leq 0.05$

signs and symptoms of		Before kegel exercises				Sig. level	After 6 weeks of kegel exercises				Sig. level	After 12 weeks of kegel exercises				Sig. level
		Study group (n=30)		Control group (n=30)			Study group (n=30)		Control group (n=30)			Study group (n=30)		Control group (n=30)		
		No	%	No	%		No	%	No	%		No	%	No	%	
Leaking urine when she cough or sneeze	None of the time	0	0.0%	0	0.0%	$\chi^2=1.382$ P=0.501	7	11	17	28.	$\chi^2=15.258$ P=0.016*	4	13.3%	0	0.0%	$\chi^2=33.893$ P=0.000*
	Rarely	0	0.0%	0	0.0%		5	16.7%	0	0.0%		10	33.3%	1	3.3%	
	Once in a while	0	0.0%	0	0.0%		2	6.7%	1	3.3%		6	20.0%	2	6.7%	
	Often	3	10.0%	2	6.7%		8	26.7%	2	6.7%		10	33.3%	7	23.3%	
	Most of the time	7	23.3%	4	13.3%		15	50.0%	22	73.3%		0	0.0%	14	46.7%	
	All of the time	20	66.7%	24	80.0%		0	0.0%	5	16.7%		0	0.0%	6	20.0%	
Leaking urine when she bends down or lifts something up?	None of the time	0	0.0%	0	0.0%	$\chi^2=0.000$ P=1.000	1	3.3%	0	0.0%	$\chi^2=13.949$ P=0.004*	5	16.7%	1	3.3%	$\chi^2=31.067$ P=0.000*
	Rarely	0	0.0%	0	0.0%		6	20.0%	1	3.3%		10	33.3%	0	0.0%	
	Once in a while	0	0.0%	0	0.0%		2	6.7%	0	0.0%		8	26.7%	4	13.3%	
	Often	3	10.0%	3	10.0%		7	23.3%	3	10.0%		7	23.3%	8	26.7%	
	Most of the time	14	46.7%	14	46.7%		14	46.7%	22	73.3%		0	0.0%	16	53.3%	
	All of the time	13	43.3%	13	43.3%		0	0.0%	4	13.3%		0	0.0%	1	3.3%	
Leaking urine when she walks quickly, jogs or exercise?	None of the time	0	0.0%	0	0.0%	$\chi^2=0.164$ P=0.921	1	3.3%	0	0.0%	$\chi^2=16.400$ P=0.006*	7	23.3%	0	0.0%	$\chi^2=35.336$ P=0.000*
	Rarely	0	0.0%	0	0.0%		6	20.0%	2	6.7%		13	43.3%	4	13.3%	
	Once in a while	0	0.0%	0	0.0%		5	16.7%	0	0.0%		9	30.0%	3	10.0%	
	Often	5	16.7%	4	13.3%		4	13.3%	6	20.0%		1	3.3%	6	20.0%	
	Most of the time	9	30.0%	10	33.3%		14	46.7%	14	46.7%		0	0.0%	13	43.3%	
	All of the time	16	53.3%	16	53.3%		0	0.0%	8	26.7%		0	0.0%	4	13.3%	
leaking urine and running down legs onto floor	None of the time	0	0.0%	0	0.0%	$\chi^2=0.504$ P=0.777	0	0.0%	0	0.0%	$\chi^2=19.538$ P=0.001*	5	16.7%	0	0.0%	$\chi^2=35.044$ P=0.000*
	Rarely	0	0.0%	0	0.0%		7	23.3%	2	6.7%		16	53.3%	4	13.3%	
	Once in a while	0	0.0%	0	0.0%		5	16.7%	0	0.0%		8	26.7%	3	10.0%	
	Often	2	6.7%	1	3.3%		4	13.3%	6	20.0%		1	3.3%	6	20.0%	
	Most of the time	14	46.7%	13	43.3%		14	46.7%	11	36.7%		0	0.0%	7	23.3%	
	All of the time	14	46.7%	16	53.3%		0	0.0%	11	36.7%		0	0.0%	10	33.3%	
Using pads	None of the time	0	0.0%	0	0.0%	$\chi^2=1.111$ P=0.292	1	3.3%	0	0.0%	$\chi^2=16.310$ P=0.006*	5	16.7%	2	6.7%	$\chi^2=33.333$ P=0.000*
	Rarely	0	0.0%	0	0.0%		4	13.3%	2	6.7%		18	60.0%	3	10.0%	
	Once in a while	0	0.0%	0	0.0%		7	23.3%	0	0.0%		6	20.0%	3	10.0%	
	Often	0	0.0%	0	0.0%		4	13.3%	3	10.0%		1	3.3%	2	6.7%	
	Most of the time	14	46.7%	10	33.3%		14	46.7%	18	60.0%		0	0.0%	15	50.0%	
	All of the time	16	53.3%	20	66.6%		0	0.0%	7	23.3%		0	0.0%	5	16.7%	
feel her sex life has been affected by urine leakage	None of the time	0	0.0%	0	0.0%	$\chi^2=2.963$ P=0.085	0	0.0%	0	0.0%	$\chi^2=16.310$ P=0.006*	5	16.7%	0	0.0%	$\chi^2=36.423$ P=0.000*
	Rarely	0	0.0%	0	0.0%		5	16.7%	2	6.7%		9	30.0%	4	13.3%	
	Once in a while	0	0.0%	0	0.0%		7	23.3%	0	0.0%		9	30.0%	3	10.0%	
	Often	0	0.0%	0	0.0%		4	13.3%	4	13.3%		7	23.3%	1	3.3%	
	Most of the time	5	16.7%	1	3.3%		14	46.7%	14	46.7%		0	0.0%	18	13.3%	
	All of the time	25	83.3%	29	96.7%		0	0.0%	10	33.3%		0	0.0%	4	13.3%	

Table (II): Comparison between the Study and the Control Groups related to Effect of kegels' Exercise Training on Female Stress Urinary Incontinence Signs and Symptoms.

χ^2 : Chi square test p: p value for association between different categories * Statistically significant at $p \leq 0.05$

Table (III): Comparison between the Study and the Control Groups Related to Effect of Kegels' Exercise Training on Patients' Daily Activities, Physical Activities, Social Activities and Emotional Wellbeing.

patients' daily activities, physical, social and emotional items		Before kegel exercises				Sig. level	After 6 weeks of kegel exercises				Sig. level	After 12 weeks of kegel exercises				Sig. level
		Study group (n=30)		Control group (n=30)			Study group (n=30)		Control group (n=30)			Study group (n=30)		Control group (n=30)		
		No	%	No	%		No	%	No	%		No	%	No	%	
Household tasks	Not at all	0	0.0%	0	0.0%	$\chi^2=0.067$ P=0.795	10	33.3%	1	3.3%	$\chi^2=45.130$ P=0.000*	15	50.0%	2	6.7%	$\chi^2=24.587$ P=0.000*
	Slightly	0	0.0%	0	0.0%		18	60.0%	1	3.3%		14	46.7%	11	36.7%	
	Moderately	17	56.7%	16	53.3%		1	3.3%	17	56.7%		1	3.3%	13	43.3%	
	A lot	13	43.3%	14	46.7%		1	3.3%	11	36.7%		0	0.0%	4	13.3%	
job, or your normal daily activities outside the home?	Not at all	0	0.0%	0	0.0%	$\chi^2=0.271$ P=0.602	12	40.0%	1	3.3%	$\chi^2=40.474$ P=0.000*	21	70.0%	2	6.7%	$\chi^2=43.696$ P=0.000*
	Slightly	0	0.0%	0	0.0%		13	43.3%	0	0.0%		9	30.0%	3	10.0%	
	Moderately	16	53.3%	18	60.0%		5	16.7%	19	63.3%		0	0.0%	16	53.3%	
	A lot	14	46.7%	12	40.0%		0	0.0%	10	33.3%		0	0.0%	9	30.0%	
Physical activities (e.g. going for a walk, running, sport, gym etc)?	Not at all	0	0.0%	0	0.0%	$\chi^2=1.043$ P=0.593	13	43.3%	1	3.3%	$\chi^2=30.532$ P=0.000*	19	63.3%	2	6.7%	$\chi^2=43.333$ P=0.000*
	Slightly	1	3.3%	0	0.0%		12	40.0%	3	10.0%		11	36.7%	3	10.0%	
	Moderately	18	60.0%	18	60.0%		5	16.7%	21	70.0%		0	0.0%	20	66.7%	
	A lot	11	36.7%	12	40.0%		0	0.0%	5	16.7%		0	0.0%	5	16.7%	
ability to engage in kind of enjoyable activities	Not at all	0	0.0%	0	0.0%	$\chi^2=0.268$ P=0.605	17	56.7%	2	6.7%	$\chi^2=33.871$ P=0.000*	21	70.0%	3	10.0%	$\chi^2=42.955$ P=0.000*
	Slightly	0	0.0%	0	0.0%		11	36.7%	4	13.3%		9	30.0%	2	6.7%	
	Moderately	13	43.3%	15	50.0%		2	6.7%	19	63.3%		0	0.0%	14	46.7%	
	A lot	17	56.7%	15	50.0%		0	0.0%	5	16.7%		0	0.0%	11	36.7%	
ability to travel?	Not at all	0	0.0%	0	0.0%	$\chi^2=0.635$ P=0.426	4	13.3%	2	6.7%	$\chi^2=8.982$ P=0.030*	18	60.0%	2	6.7%	$\chi^2=43.200$ P=0.000*
	Slightly	0	0.0%	0	0.0%		16	53.3%	7	23.3%		12	40.0%	3	10.0%	
	Moderately	17	56.7%	20	66.7%		10	33.3%	19	63.3%		0	0.0%	18	60.0%	
	A lot	13	43.3%	10	33.3%		0	0.0%	2	6.7%		0	0.0%	7	23.3%	
social life?	Not at all	0	0.0%	0	0.0%	$\chi^2=2.963$ P=0.085	6	20.0%	3	10.0%	$\chi^2=13.511$ P=0.004*	21	70.0%	2	6.7%	$\chi^2=43.696$ P=0.000*
	Slightly	0	0.0%	0	0.0%		15	50.0%	4	13.3%		9	30.0%	3	10.0%	
	Moderately	19	63.3%	20	66.7%		8	26.7%	20	66.7%		0	0.0%	19	63.3%	
	A lot	11	36.7%	10	33.3%		1	3.3%	3	10.0%		0	0.0%	6	20.0%	
ability to see and visit friends?	Not at all	0	0.0%	0	0.0%	$\chi^2=0.800$ P=0.371	9	30.0%	1	3.3%	$\chi^2=16.876$ P=0.001*	19	63.3%	2	6.7%	$\chi^2=43.333$ P=0.000*
	Slightly	0	0.0%	0	0.0%		15	50.0%	8	26.7%		11	36.7%	3	10.0%	
	Moderately	24	80.0%	21	70.0%		5	16.7%	17	56.7%		0	0.0%	21		
	A lot	6	20.0%	9	30.0%		1	3.3%	4	13.3%		0	0.0%	4		

χ^2 : Chi square test p: p value for association between different categories * Statistically significant at $p \leq 0.05$

Discussion

Urinary incontinence (UI) could be exceptionally common complaint. It causes a fabulous bargain of distress and humiliation, further as noteworthy costs, to both individuals and societies. Appraisals of prevalence differ in line with the definition of incontinence and also the population studied. However, there is universal agreement about the significance of the matter in terms of human enduring and financial taken a toll (**Bedretdinova, Berghmans, Bosch, Burkhard, Cruz, Nambiar, Nilsson, Tubaro, Pickard 2015**). Two chief types are described: stress incontinence, inside which urine leaks in association with exercise, and urgency incontinence, during which urine leaks in association with a sudden compelling need to void. Women who experience both symptoms are considered as having mixed incontinency (**Aoki, Heidi, Brubaker and Cornu 2017**). Stress incontinence (SUI) could be a common problem experienced by many females. SUI can have a huge negative affect on the standard of life of not only people who endure from the condition, but also potentially on those friends and members of the family whose lives and activities may additionally be limited (**Kathleen, Kobashi, Michael, Roger, Howard, Stephen, Jonathan and Gary 2017**). Research has revealed corresponding probable causes of incontinence, comprising dysfunction of the detrusor muscle or muscles of the pelvic floor, dysfunction of the neural controls of storage and voiding, and perturbation of the local environment within the bladder (**Aoki et al.; 2017**). Widely used for first-line treatment, pelvic floor rehabilitation primarily comprises pelvic floor muscle training (PFMT), also referred to as kegel exercise.

Several studies have reported the impact of pelvic floor muscles exercises but have secured the female urinary incontinence with stress, urge, and mixed UI or have apportioned with all nonsurgical treatment including humanizing the lifestyle, bladder training, pelvic floor muscle exercises, biofeedback, and the electrical stimulation of pelvic muscles. There is a lack of exploratory prove in Egypt to verify the benefits of kegel exercise on female stress urinary incontinence. Therefore, the current study was conducted to appraise the efficiency of kegel exercise on female stress urinary incontinence.

The results of the present study revealed that there were no statistical significant differences in sociodemographic and clinical data between the study and control groups which included age, the level of education, marital status, living, employment status, residence and current prescribed medication. These findings roll out the extraneous factors that might confuse the effect of kegel exercises on the management of female stress urinary incontinence.

In relation to leaking urine when cough, sneeze, bend down, lift something up, walk quickly, jog or exercise the present study revealed that all women in both groups experienced these symptoms and there was no statistical significant difference between the study and control groups before application of kegel exercises. This may be endorsed to the fact that stress urinary incontinence involves the involuntary loss of urine when physical forces on the bladder are increased during physical movement of the body, include loss of urine with coughing, sneezing, exercising, or picking up overwhelming stuffs (**Victor and Maryland 2015**).

Moreover, there was no statistical significant difference between the study and the control groups in relation to leaking urine and running down legs onto floor, using pads and sex life has been affected by urine leakage the present study showed that all women in both groups had these symptoms and there was no statistical significant difference between the study and control groups before application of kegel exercises, therefore both groups exposed nearly to the same degree of disruption that stress urinary incontinence cause. Hence, they gave the same description of their experienced urinary incontinence. In line with this result previous study by **(Topuz and Seviğ 2016)** shown that coughing and sneezing ranked as first cause of involuntary leaking urine (93.3%) and most of women abstained from sexual intercourse due to urinary incontinence.

The result of the present study also revealed that there was statistical significant improvement in the study group than control in all stress incontinence measured outcome criteria after 6 weeks and after 12 weeks after application of kegel exercises. This may be attributed to effects of kegel exercises include firming the pelvic floor muscles, supporting and strengthening the bladder outlet, supporting in preventing leakage of urine or feces with coughing, sneezing, lifting, and other stressful movements. Other benefits of kegels include improved sexual function, decline and prevent prolapse of pelvic organs **(Bruce 2009)**. This result is consistent with **(Christopher and Senanu 2020)** who found that Kegel exercises are effective treatment for weakened pelvic floor muscles. The results of the present study were in accordance with the results of studies conducted by **(Choo, Kim, Shin and Young 2015)** the results showed that significant improvements were found in attitude toward pelvic muscle exercise, pelvic muscle strength, and incontinence factor. Daily performance of pelvic muscle exercise for 8 weeks was positively correlated with improved incontinence factor and with quality of life related to urinary tract symptoms.

Furthermore, a systematic review conducted by **(Park and Kang. 2014)**) appear the impact of Kegel exercises on reducing urinary incontinence symptoms in women with stress urinary incontinence. The results revealed that Kegel exercises significantly reducing the frequency urinary incontinence and relieving symptoms of female stress urinary incontinence. Moreover, a systematic review done by **(Jácomo, Fitz, Alves and Fernandes 2002)** to evaluate the effects of pelvic floor muscle training in urinary incontinent; originate that there was significant improvement in urinary symptoms after conducting the training program.

The current study revealed that there was no statistical significant difference between both study and control groups in first assessment before applying kegel exercises, related to effect of urinary incontinence on household activities, job, or normal daily tasks outside the home, physical exercises (e.g. going for a walk, running, sport and gym), ability to engage in kind of enjoyable activities, ability to travel, ability to see and visit friends, feel anxious, nervous or depressed, all of these activities and feeling were affected in all participants by stress urinary incontinence. This result is in line with **(Lim, Liong, Leong, Lau, Khan and Yuen 2018)** who showed that female stress urinary incontinence had significantly poor influence on all constituents of quality of life items when compared with other types of continence including negative effect on physical activities, job and emotions. Another study conducted by **(Mallah, Montazeri, Ghanbari, Tavoli, Haghollahi, and Azimineko 2014)**

concluded that women with urinary incontinence had a significant lower degree in mental health and Quality of life. In Contrary to these results a study done by **(Lempinena, Laippalab, nojab and Kujansuuc 2004)** discovered that there was no alteration in any parameters of physical activities by urinary incontinence. We can return this to this study accomplished on three diverse types of urinary incontinence and not only females stress incontinence.

The result of the present study also revealed that there was statistical significant improvement in the study group than control in effect of urinary incontinence on household tasks, job, or normal daily activities outside the home, physical activities (e.g. going for a walk, running, sport and gym), ability to engage in kind of enjoyable activities, ability to travel, ability to see and visit friends, feel anxious, nervous or depressed after 6 weeks and after 12 weeks after application of kegel exercises. This may be attributed to effects of kegel exercises on decreasing all urinary in continence symptoms and severity resulting in improvement of physical activities, social life and psychological wellbeing.

These findings are consistent with **(Radzimińska, Strączyńska, Styczyńska, Strojek and Piekorz 2018)** systematic literature review who explore the impact of pelvic floor muscle training (PFMT) on women with urinary incontinence. The results of this literature review partied that PFMT is an effective treatment for UI in women. PFMT appears to be an effective non-surgical intervention, predominantly for women with SUI. It must also be recommended as the first-line conservative treatment for UI in women. The majority of patients in the study groups eminent a statistically significant improvement in QoL of women with UI including their physical, mental, and social functioning. The duration of PFMT should not be shorter than 6 weeks to be effective. It is recommended to be used as a monotherapy for the management of UI in women.

In endorsement with this results **(Ptak, Ciećwież, Brodowska, Starczewski, Nawrocka-Rutkowska, Diaz-Mohedo and Rotter 2019)** stated that PFM exercises for 12 weeks advance the QoL of women with SUI together with the performance of household duties and outside home activities, physical activity and the possibility of travelling , and social life: interpersonal contacts and the possibility of gathering friends, emotions, sleep difficulties and fatigue, the frequency of changing panty liners, fluid intake control, changing wet underwear or pad, anxiety associated with unpleasant smell, and awkwardness.

It is clear from the forgoing discussion those women with stress incontinence and managed with kegel exercises had less SUI severity, decrease SUI symptoms over and above improve their physical activities, psychological status and social activities. It is the time that health care organizations strive towards evidence-based, educate their staff on it, determine the barriers to its application in nursing practice and devise strategies to overcome those barriers in order to ensure the best patient's management outcome. Physicians, nurses and administrators must collaborate to guarantee that evidence-based practices are implemented and enforced in the clinical settings.

Conclusion:

Kegel exercises for female SUI patients have significant improvement in outcome criteria of urinary incontinence.

Recommendations

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

1. Kegel's exercise can utilized as an viable management for treating urinary incontinence and refining quality of life
2. In service training programs for nurses about the application of Kegel's exercise for management of urinary incontinence is recommended.
3. The developed booklet with its straightforward instructions and illustrations should be utilized in hospitals as a teaching aid for incontinent women.
4. Replication of the present study under dissimilar circumstances (sampling, setting, measurement, duration of management) is recommended to confirm its results.

References

Abrams K., Andersson L. and Birder A. (2010) "Fourth international consultation on incontinence recommendations of the international scientific committee: evaluation and treatment of urinary incontinence, pelvic organ prolapse, and fecal incontinence," *Neurourology and Urodynamics Journal*, 29: 213–240.

Aoki Y., Heidi W., Brubaker J. and Cornu J.(2017) Urinary incontinence in women; journal of Research Gate, 3(17042):27

Bedretdinova D., Berghmans L., Bosch J., Burkhard F., Cruz F., Nambiar A., Nilsson C., Tubaro A., Pickard R. (2015) Guidelines on Urinary Incontinence. *European Association of Urology*; 56(1):81-95.

Brazier J., Czoski-Murray C. and Roberts J. (2007) Estimation of a Preference-Based Index from a Condition-Specific Measure: The King's Health Questionnaire. *Strategic Advisory Group of Experts Journal*; 28.

Bruce M.(2009) Kegel Exercises; Bowel Control Program and Physical Therapy. Available at: <https://medicine.umich.edu/sites/default/files/content/downloads/kegel-exercises.pdf>. Retrieved in May 2020.

Choo H., Kim M., Shin K. Young K.(2015) Combined pelvic muscle exercise and yoga program for urinary incontinence in middle-aged women. *Japan Journal of Nursing Science*;12(4):330-9.

Catherine S., David D., Ingrid E., Matthew D., Charles W., Kimberly S., Nazema Y. and Robert B.(2010) The Questionnaire for Urinary Incontinence Diagnosis (QUID): Validity and Responsiveness to Change in Women Undergoing Non-Surgical Therapies for Treatment of Stress Predominant Urinary Incontinence. *Neurourology Urodynamic Journal*;29(5):727-34.

Christopher O. and Senanu E. (2020) Protocol for Investigating the Effect of Kegel Exercises on Pelvic Floor Muscle Disorders and Quality of Life among Pregnant and Postnatal Women. *Mother Child Health Journal*; 17 (2) No:1000345

Daneshgari F. (2010) “Surgical treatment of female stress urinary incontinence, decades learned lessons,” *European Urology Journal*, 58 (2): 239–241.

El-Azab A., Mohamed E. and Sabra H.(2007) The prevalence and risk factors of urinary incontinence and its influence on the quality of life among Egyptian women. *Neurourology and Urodynamics Journal* 26(6):783-8.

Fantl J., Newman D. and Colling J. Urinary Incontinence in Adults: Acute and Chronic Management. Clinical Practice Guideline No. 2, Update. Rockville, MD: U.S. Department of Health and Human Services. Public Health Service, Agency for Health Care Policy and Research. AHCPR Publication No. 96-0682. Available at: <https://onlinelibrary.wiley.com/doi/epdf/10.1111/j.1745-7599.1996.tb00681.x> retrieved in September 2020.

Ford A., Rogerson L., Cody J., Aluko P. and Ogah J. (2017) Mid-urethral sling operations for stress urinary incontinence in women. *Cochrane Database Journal*, 7: CD006375.

Hay-Smith E., Berghmans K. and Hendriks H. (2011) “Pelvic floor muscle training for urinary incontinence in women,” *Cochrane Database of Systematic Reviews*, 18: CD001407.

Hills N. and Jackson K. International Consultation on Incontinence Modular Questionnaires(ICIQ) Available at : [https://physio-pedia.com/International_Consultation_on_Incontinence_Modular_Questionnaires_\(ICIQ\)](https://physio-pedia.com/International_Consultation_on_Incontinence_Modular_Questionnaires_(ICIQ)). Retrieved in June 2019.

Jácomo R., Fitz F., Alves A. and Fernandes I.(2014) The effect of pelvic floor muscle training in urinary incontinent elderly women: a systematic review. *Scientific Electronic Library Online*, 27(4).

Kang T., Kim H. and Kim J.(2012) *Guidelines on Urinary Incontinence*, Korean Incontinence Society, Seoul, Korea, 15(3):234-42.

Kathleen C., Kobashi M., Michael E., Roger R., Howard B., Stephen R., Jonathan R. and Gary E. (2017) Surgical Treatment Of Female Stress Urinary Incontinence: Aua/Sufu Guideline. *American Urological Association (AUA) / Society of Urodynamics, Female Pelvic Medicine & Urogenital Reconstruction*;198(4):875-883.

Latthe P., Foon R., and Khan K. (2008) “Nonsurgical treatment of stress urinary incontinence (SUI): grading of evidence in systematic reviews,” *BJOG*, vol. 115, no. 4, pp. 435–444,

Lempinen B.,*, Laippalab P., nojab R. and Kujansuuc E. (2004) Is physical activity influenced by urinary incontinence? *International Journal of Obstetrics and Gynaecology*; 111: 475 - 80.

Lim R. , Liong M. , Leong W., Lau Y., Khan N. and Yuen K. (2018) The Impact of Stress Urinary Incontinence on Individual Components of Quality of Life in Malaysian Women. *Pubmed Journal*; 112:38-45.

Mallah F., Montazeri A., Ghanbari Z., Tavoli A., Haghollahi F., and Azimineko E. (2014) Effect of Urinary Incontinence on Quality of Life among Iranian Women. *Journal of Family and Reproductive Health*. 8(1): 13-19.

Ministry of Health. (2003) Nursing Management of Patients with Urinary Incontinence. Available at: https://www.moh.gov.sg/docs/librariesprovider4/guidelines/nursing_management_of_patients_with_urinary_incontinence.pdf Retrieved in September 2020.

Mørkved K., Frawley H., and Sherburn M. (2009) “Evidence for benefit of transversus abdominis training alone or in combination with pelvic floor muscle training to treat female urinary incontinence: a systematic review,” *Neurourology and Urodynamics*, 28(5): 368–37.

Park S. and Kang C. (2014) Effect of Kegel Exercises on the Management of Female Stress Urinary Incontinence: A Systematic Review of Randomized Controlled Trials. ***Journal of Advances in Nursing***; ID 640262:10-21

Pereira V., Melo M., Correia G., and Driusso P. (2012) “Vaginal cone for postmenopausal women with stress urinary incontinence: randomized, controlled trial,” *Climacteric Journal*, 15: 45–51.

Ptak M., Cieciewicz S., Brodowska A., Starczewski A., Nawrocka-Rutkowska J., Diaz-Mohedo E. and Rotter L. (2019) The Effect of Pelvic Floor Muscles Exercise on Quality of Life in Women with Stress Urinary Incontinence and Its Relationship with Vaginal Deliveries. *BioMed Research International Journal*; ID 5321864.

Radzimińska A., Strączyńska A., Styczyńska H, Strojek K. and Piekorz Z.(2018) The impact of pelvic floor muscle training on the quality of life of women with urinary incontinence: a systematic literature review. *Journal of Clinical Intervention in Aging*; 13: 957- 65.

Shamliyan T., Kane R., Wyman J., and Wilt T. (2008) “Systematic review: randomized, controlled trials of nonsurgical treatments for urinary incontinence in women,” *Annals of Internal Medicine*, 148 (6):459–473.

Topuz S. and Seviğ E. (2016) Effects of kegel exercises applied to urinary incontinence on sexual satisfaction. *International journal of clinical and experimental medicine* 2016;9(6):12365-74.

Townsend J. (2014) Postpartum stress urinary incontinence. *Independent Nurse*, 2007(8).

Upadhyay A. Self-Report Urinary Incontinence Questionnaire. Available at https://www.physio-pedia.com/Self-Report_Urinary_Incontinence_Questionnaire Retrieved in August 2019.

Victor W. and Maryland L.(2015) Stress Urinary Incontinence. The Official Foundation Of The American Urological Association

Willy G. and Miroslav L. (2011) Nonsurgical Outpatient Therapies for the Management of Female Stress Urinary Incontinence: Long-Term Effectiveness and Durability. Journal of Advances in urology; 2011(176498):14.

Yoo E., (2006) “Pelvic floor muscle rehabilitation,” Korean Journal of Obstetrics and Gynecology, 49(9):1838–1843.