

Effect of Kegel Exercise Training Program On Improving Quality Of Life Among Women With Urinary Incontinence

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Abstract:

Background: Urinary incontinence is a prevalent and distressing problem worldwide that had a significant effect on quality of life and restricted daily activities. One of the key techniques used to rehabilitate and strengthen pelvic floor muscles and facilitate urine storage is kegel exercises. **Aim:** to evaluate effect of kegel exercise training program on quality of life among women with urinary incontinence. **Setting:** The research was conducted at outpatient gynecological clinics in two governmental hospitals in Port Said city. **Research design:** Quasi-experimental study design was used. **Sample:** Purposive sample of 403 married women with urinary incontinence who admitted to outpatient gynecological clinics. **Tools of data collection:** Woman's health assessment sheet and quality of life scale were used to collect the needed data. **Results:** More than half of the studied women (59%) had a mixed type, about one-quarter (24.6%) had urge type, and just 16.4% had urinary incontinence type of stress. More than one-third of women (37.2%) had a full cure, and more than two-thirds of women (62.8%) had improved after three months of the program. In the post-program phase, there were statistically significant improvements in the overall mean quality of life score compared to the pre-program phase. **Conclusion:** The kegel exercise training program has a positive impact on improving quality of life and urinary incontinence among women. **Recommendations:** Apply pelvic muscle exercise guidelines for women with urinary incontinence in all outpatient gynecological clinics.

Keywords: Urinary incontinence; Kegel exercise; Training programme; Women.

Introduction:

Urinary incontinence (UI) is loss of bladder control and considered as self-reported involuntary leakage of urine. It is an exceedingly common disease that affects nearly 200 million people worldwide, most of which are women and approximately represent six times more common than in males. As a result of differences in sample populations, a systematic analysis recorded a broad prevalence range of 16.2 percent to likely 81.9 percent (Akinlusi, Ottun, Oshodi, Seriki, Olalere & Kuye, 2020).

Three forms of UI are common: stress UI pointed to urine leakage caused by activity, extra effort, sneezing or coughing, meanwhile urge UI indicated a persistent feel of urgency need to urinate, and mixed UI referred to urine leakage resulting from stress and urge UI coexistence (Ural, Gücük, Ekici & Topçuoğlu, 2020). Symptoms can range from mild leakage to wetting that is uncontrollable. It is a widespread issue; it is difficult to ascertain precise statistics since many women do not feel comfortable disclosing symptoms to relatives, friends or healthcare professionals (Nightingale, 2020).

Many factors make women at risk for UI as pregnancy, vaginal birth, pelvic surgery, obesity, and age are recognized risk variables for UI in the general female population (Altman, et al, 2017).

Urinary incontinence is not a deadly disease, but may have serious effect, it effects on quality of life (QOL). Women with urinary incontinence had limitation in everyday life, sexual and interpersonal relationships. Ultimately, associated emotional concerns such as shame, depression, sadness, and poor body image and confidence have a detrimental influence on quality of life (Hay-Smith, Herderschee, Dumoulin, & Herbison, 2012). Despite these adverse effects, most women with urinary incontinence do not seek health treatment because they perceive urinary incontinence is a natural product of childbirth and aging, rather than a severe health issue (Kim, Kim, Shin, Choo & Kim, 2015).

Surgery, substance rehabilitation, behavioral treatments, and biofeedback are part of the popular UI care regimen. Behavioral therapies like pelvic muscle technique and rectal balloon exercise have been proposed as noninvasive essential cure without any complications (Kim et al., 2015). Roongsirisangrat, Rangkla, Manchana and Tantisiriwat (2012) demonstrated that behavioral therapy is preferred by 61% of patients with stress UI. The rate of improvement (73%) using behavioural alteration therapy was comparable to that for pharmacotherapy (74%).

Several studies have published systematic reviews of exercises on pelvic floor muscles covering stress, urge, and mixed UI female urinary incontinence or have dealt with all nonsurgical care, including drugs (Park & Kang, 2014). Kegel exercise is the most common technique for enhancing pelvic floor

muscles, and is non-invasive therapy so that no vaginal weights or cones are placed. This exercise is implemented through pelvic floor muscle contract and relaxation. It is useful for raising pelvic floor muscles strength, stretching and increasing urethra muscle strength, thereby resolving urinary incontinence (Yanthi, 2011).

Kegel exercise was also considered the most cost-effective therapy and differs from other treatments in can performed at any time, practicing while doing other jobs, and without daily visits to the hospital. In order to contract their pelvic floor muscles, patients actually need to frequent training (Park & Kang, 2014).

In developing new ways to prevent and control UI, nurses should be more innovative and imaginative. Nurses play an important role in fostering of urinary continence. This position encompasses research-based practice, education, training, and implementation of high-quality practices. Furthermore nurses teach women how to maintain good health, avoid complications, and aid in the restoration of normal functions (Hung, Hsiao, Chih, Lin & Tsauo, 2010).

According to Sharaf, El Sebai, Ewieda, Shokry & Salem (2010), nurses are valuable tools for incontinent women in terms of assisting with technique selection and management. Nurses can also be the most cost-effective health-care provider when it comes to urinary incontinence (Deng, 2011). Therefore kegel exercise should be used as first-line therapy for women with UI.

Significance of the study:

Urinary incontinence appears to be an incredibly common cross-cultural and expensive disorder that affects women of all ages. 20-60 percent of women in the

Middle East complain about UI (Nazzal, Khatib, Al-Quqa, Abu-Taha & Jaradat, 2020). It is considered a stigmatising disorder that can interfere with their overall quality of life, loss of self-esteem and everyday activities that are reduced.

In addition, urinary incontinence still associated with low levels of women demanding care in health care institutions due to women shamed to speak regard this issue or thinking the disorder is incurable (Sawaqed, Al Kharabsheh, Tout, Zaidan, Khashram & AlShunaigat, (2020). This research is therefore intended to evaluate effect of kegel exercise training program on enhancing urinary incontinence and quality of life in urinary incontinence women.

Aim of the Study:

This study aimed to evaluate effect of kegel exercise training program on improving quality of life among women with urinary incontinence.

Specific objectives:

1. Assess types of urinary incontinence in women.
2. Describe pattern of urinary incontinence in women.
3. Assess quality of life for women with urinary incontinence.
4. Explore effect of kegel exercise training program on enhancing urinary incontinence and quality of life among women with urinary incontinence.

Research Hypothesis

Kegel exercise training program has a positive effect on improving urinary incontinence and quality of life among women with urinary incontinence.

Subjects and Method:

Research design: A quasi-experimental study with pre and post evaluation after three months.

Setting: The study was conducted at the gynecological outpatient clinics of two government hospitals located in Port Said city, covering different sectors and associated to the comprehensive health insurance scheme, namely as follows:

1- Al-Hayat Port Fouad hospital which includes one outpatient clinic (gynecology clinic).

2- Specialist hospital for women and obstetrics containing 3 outpatient clinics (gynecology clinic, family planning clinic and prenatal clinic).

Study subjects:

By using the following equation (Dobson, 1984), the sample size was determined:

$$\text{Sample size (n)} = \frac{Z^2}{\Delta^2} P(100 - P)$$

p : The prevalence of women suffering from urinary incontinence in Egypt = 39 (Mourad et al., 2019).

$Z_{\alpha/2}$: a percentile of standard normal distribution determined by 95% confidence level = 1.96

Δ : The width of the confidence interval = 5.

$$1.96^2$$

Sample size (n) = ----- $39 \times (100 - 39) = 366$ Women
5²

The sample size that was measured was 366 women. The final sample size was 403 females because of the predicted non-participating rate (10 percent).

Study sampling:

Purposive sample of 403 married women with urinary incontinence from previous settings was included in compliance with the following inclusion criteria:

- Married women aged 17 to 45 years of age.

- Women diagnosed with stress, urge or mixed UI with at least one monthly loss episode.

- Stable women without prior or present UI therapy

- Non-neurological illnesses, mental conditions, genital prolapses and urinary tract infections in healthy women.

- Not pregnant

Tools of study: two instruments have been used to gather required data in this study.

First tool: Woman's health assessment sheet that was composed of four parts:

Part I. This part developed by researcher and involves the following data:

- 1.Socio-demographic characteristics of the women like women age, marital status, educational level and work position.

- 2.Medical history: history of chronic disease as diabetes mellitus,

hypertension, anemia, heart disease and others, arthritis/rheumatic, hepatitis C and medications prescribed.

- 3.Surgical history: history of UI surgery, prolapse surgery, hysterectomy, appendix, cholecystectomy, thyroidectomy, oophorectomy, ovarian cyst, uterine fibroid and back cartilage.

- 4.Obstetrical history: which include gravidity, parity, number of abortion and number of living children and mode of delivery.

- 5.Physical examination: weight and height and body mass index.

Part II. Urinary Incontinence Scale

It was used to assess urinary incontinence patterns. It consist of 34 items covered 4 main domains. Namely: pattern of urinary incontinence (5 items), stress urinary incontinence (9 items), urge urinary incontinence (6 items) and mixed urinary incontinence (14 items) as developed by **Jayachandran (2007)** in English language.

Scoring: items were scored 0 for (never), 1 for (rarely), 2 for (sometimes) and 3 for (often). Items 1 to 9 responses are summed for the stress score; and items 10 to 15 are summed for the urge and responses to items 16 to 30 are summed for the mixed urinary incontinence.

Part III. Vaginal examination

test: This test involve insertion of lubricated and gloved fingers into women vagina and asked her to squeeze over the examiner finger to measure her capability for contraction. The pelvic floor muscle tone is characterized by the following scale: 0 for no contraction, 1 for bad contraction (slight pressure), 2 for healthy contraction (medium hard pressure for less than 5 seconds) and 3 for strong

contraction (strong pressure for more than 5 seconds) as developed by **Brink, Wells, Sampsel** (1994) in English language.

Part IV. Provocation test: used to assess amount of urine leakage while and after 5-fold vigorous cough of the woman. Urine leakage is calculated on the following scale: for no leakage 0; slight leakage (a few drops of urine) 1; for moderate leakage throughout roughly 2 and severe leakage 3 as developed by **Hahn & Fall** (1991) in English language.

Second tool: namely incontinence impact questionnaire – short form (IIQ-7)

It was used to determine health-related quality of life (QOL) impacted by UI. It was adopted from **Gray & Wyman** (2004). Seven items were included in the questionnaire to clarify urine leakage influence on physical exercise, house duties, societal events, entertainment activities, travelling, emotionally health, and frustration. Items were scored 0, 1, 2, and 3 for the responses “not at all”, “slightly”, “moderately”, and “greatly”, respectively. The highest IIQ-7 scores, the greatest negative effect on QOL health.

Tool validity: a panel of seven experts in the field of obstetrics & gynecological nursing and community health nursing were checked tools to assess its content; adjustments had made accordingly on the basis of their judgment.

Tool reliability: Cronbach's alpha coefficient test showed was $r = 0.81$ for urinary incontinence scale, $r = 0.92$ for vaginal examination test, $r = 0.97$ for provocation test and the alpha coefficient was 0.88 for IIQ-7 scale as showed by high reliability of the tools used.

Procedure

Before carrying out the study, an official letter directed to outpatient clinics manager to obtain permission to collect data after specifying the purpose of the study.

Ethical considerations:

The faculty of nursing's Ethical Committee accepted the research proposal. An official letter from faculty of nursing Port Said University was addressed for the responsible authorities, after explaining its intent, to obtain their permission to carry the study. Study aim had clarified to all women and an oral agreement was obtained for participation in the study. Those who decided to participate were assured confidentiality, privacy and their right to withdraw from the research.

Pilot study:

A pilot study of 10 percent of sample (40) was performed to assess utility, accuracy and objectivity of the methods and time required for tools collection.

Field work:

Before carrying out the study, approval was taken from outpatient clinic directors, and then oral consent has obtained from women to participate in study. Data collection was implemented through four phases: assessment phase, phase of planning, phase of implementation and phase of evaluation. These phases were performed from 1 November 2019 to the end of April 2020 from the previous mentioned setting. Women participation in the research was entirely voluntary and oral consent was taken before participation.

Assessment phase: The researchers reviewed different relevant literatures and prepared study questionnaire for pretest assessment. Assessment data provide the base for building-up the program.

Planning phase: after deciding the program goals, the material was chosen careful after analysis of urinary incontinence women needs.

Implementing phase: All women involved in the study were addressed to the purpose of the study. The researchers admitted to outpatient clinic three days per week from 9am to 2 pm. The kegel exercise educational training program was implemented over four sessions per day for women. First session involves welcome, introduction to the program, definition of terms related to urinary incontinence, risk factors and types of urinary incontinence. Second session include benefits of kegel exercise, explaining kegel exercise procedure and answering the women's inquiries. kegel exercise which designated to strengthen women pelvic floor muscles and protect the bladder and bowel openings. Kegels also improve sexual function and avoid pelvic organ prolapse.

Practical phase of kegel exercise was performed by instructing women to identify and feel pelvic floor muscles contractions while sitting and standing. Contract pelvic floor muscles for 3 to 5 seconds. Then relax for 3 to 5 seconds and repeat the contract/relax cycle 10 times. Gradually increase the length of contractions and relaxations. Work her way up to 10-second contractions and relaxations. Instruct women to try to do at least 30 to 40 kegel exercises every day by spreading them throughout the day.

Third session contain activities taught, repeating the exercise to ensure

they knew how to do it properly in conjunction with take home educational material which prepared in Arabic language literature review. Fourth session include healthy life style education and dietary management (as body weight reduction, avoid long time standing, avoid lifting heavy objects, consuming food rich in vitamins such as non-acidic fruits and vegetables, and drinking too much fluid in the morning and afternoon rather than at night).

The session began after women complete their examination; it was possibly the most appropriate time for the women. Each session was about 30-45 minutes. Researchers have developed the program after reviewing literature to supply urinary incontinence women with strategies to improve quality of daily living. In simple and concise form, the instructional material was introduced, using several teaching techniques such as: brain storming, discussion, and including examples. During implementation of the program, adequate teaching aids were prepared as data shows, photographs, videos and role play for successful kegel exercise. Data collection start from the first of November 2019 until the end of April 2020.

Evaluation phase: Women's follow-up has been implemented through weekly telephone correspondence for refreshing knowledge and procedure. After three months of the program, women were retained for follow-up in outpatient clinics. Simple vaginal examination test, Provocation test, characteristics of UI and QOL were tested during follow-up to determine improvements in strength, degree of incontinence and QOL. After implementation of training program, each woman was reassessed post three months later to evaluate effect of kegel training program on quality of life among women

with urinary incontinence using the study tool (Tool I part 2,3 &4 and Tool II).

Statistical analysis:

Up completion of data collection, variables included in the interviewing schedule, were coded prior to computerized data entry. The raw data has been coded and translated into sheet coding. Then using the statistical software package SPSS 20.0, the data was entered. For typing and spelling mistakes, output draughts were reviewed against the revised coded results. For the overall sample and for BMI and incontinence status, descriptive statistics including means, standard deviations, minimum, maximum and proportions have obtained. To assess the mean difference between two pre and posttests, a paired sample t-test was used for continuous normally distributed variables. While chi-square test was used for compare between categorical variables. Finally, interpretation of data was carried out.

Results:

Table 1 clarifies socio demographic characteristics of the studied women. Their mean age was 33.87 ± 7.29 with the highest percentage (47.6%) more than 25 to less than 35 years of age. About half of women (49.4%) had secondary level of education and great majority of them (94.1%) were married. Also, majority of the studied women (84.9%) were house wife. In regarding BMI about half of the studied women (47.3%) were obese more than 30 Kg/cm² regarding BMI.

Table 2 illustrated the medical history of the studied women. The majority of women (66%) had no medical history. However, more than one fifth (26.6%) of the studied women were suffered from hypertension, 3.8% from

arthritis/rheumatism, 2.2% from anemia. The least percentage had cardiac disease and hepatitis C (.7%).

Table 3 revealed the surgical history of studied women. The majority of women (73.3%) had no surgical history. However, 10.7% of the studied women had appendectomy, 6.7% had thyroidectomy, 2.7% had cholecystectomy. The least percentage had uterine fibroid, hysterectomy, oophorectomy, ovarian cyst, and back cartilage (2.2%, 2%, 1.2%, .7% & .5% respectively).

Table 4 represents obstetric history of the studied women. About half (51.1%) of the studied women had a number of pregnancy three to four times and more than two fifth (47.7%) of them delivered previously from three to four times. Meanwhile, more than half of studied women (59.6%) hadn't previous abortion and had three to four living children (54.1%). Regarding mode of delivery, more than two third (64%) of the studied women delivered cesarean deliveries.

Figure 1 shows distribution of studied women according to urinary incontinence type. More than half of studied women (59%) had mixed type, about one quarter (24.6%) had urge type and only 16.4% had stress type of urinary incontinence.

Table 5 shows pattern of urinary incontinence among studied women, which it is noticed that statistically significant improvement in post program phase compared to pre program phase in regard to rate of urine leakage, amount of urine leakage, quality of life and severity of urinary incontinence ($p = 0.001$).

Figure 2 illustrated distribution urinary incontinence rate of studied women after three months from the program. It is noticed that more than one

third of women (37.2%) had complete cure and more than two third of women (62.8%) had improved.

Table 6 shows impact of incontinence on QOL among studied women after three months. Most of studied women QOL had improved, the ability to do household work, physical recreation, entertainment activities, travelling by car or bus more than 30 minutes, social activities participation outside home, emotional health, and frustration feeling. The total mean score of studied women at pre and post program

phase was 76.07 ± 53.06 and 7.04 ± 9.74 respectively. There was statistically significant improvement in total mean score quality of life at post program phase compared to pre program phase ($p = 0.001$).

Table 7 As shown in this table, women had a significantly higher vaginal examination test score at post test phase compared to preprogram phase (2.2 ± 0.9 , $p = .002$). Also, women had a significantly lower provocative test score at post test phase compared to preprogram phase (0.5 ± 0.6 , $p = .006$).

Table 1: Distribution of the Studied Women According to their Socio-Demographic Characteristics

Socio-demographic characteristics	Studied women (n=403)	
	No.	%
Age (years)		
17-25	53	13.2%
>25-35	192	47.6%
>35-45	158	39.2%
Min-Max	17-45	
Mean±SD	33.87±7.29	
Level of education		
Illiterate	108	26.7%
Reading & write	24	6%
Basic	27	6.7%
Secondary education	199	49.4%
High education	45	11.2%
Marital status:		
Married	379	94.1%
Widowed	18	4.4%
Divorced	6	1.5%
Job		
House wives	342	84.9%
Working	61	15.1%
BMI (kg/m²)		
Underweight (<18.5)	0	0.0%
Normal (18.5-25)	54	13.5%
Overweight (>25-30)	158	39.2%
Obese (> 30)	191	47.3%

Table 2 :Distribution of the Studied Women According to their Medical History

Medical history	Studied women (n=403)	
	No.	%
None	266	66%
Hypertension	107	26.6%
Cardiac disease	3	.7%
Arthritis/rheumatism	15	3.8%
Anemia	9	2.2%
Hepatitis C	3	.7%

Table 3: Distribution of the Studied Women According to their Surgical History

Surgical History	Studied women (n=403)	
	No.	%
None	295	73.3%
Hysterectomy	8	2%
Appendectomy	43	10.7%
Cholecystectomy	11	2.7%
Thyroidectomy	27	6.7%
Oophorectomy	5	1.2%
Ovarian cyst	3	.7%
Uterine fibroid	9	2.2%
Back cartilage	2	.5%

Table 4: Distribution of the Studied Women According to their Obstetric History

Obstetric history	Studied women (n=403)	
	No.	%
No. of gravida		
Non	27	6.7%
1-2	94	23.3%
3-4	206	51.1%
>5	76	18.9%
Min-Max	0-9	
Mean±SD	3.62±1.74	
No. of Parity		
Non	33	8.2%
1-2	150	37.2%
3-4	192	47.7%
>5	28	6.9%
Min-Max	0-9	
Mean±SD	2.64±1.37	
No. of Abortions		
0	240	59.6%
1	110	27.3%
2	30	7.4%
3	15	3.7%
4	8	2 %
Min-Max	0-4	
Mean±SD	0.61±0.92	
No. of living children		
1-2	147	36.5%
3-4	218	54.1%
5-6	29	7.2%
>6	9	2.2%
Min-Max	0-11	
Mean±SD	2.76±1.57	
Mode of delivery		
Non	33	8.2%
Cesarean deliveries	258	64%
Vaginal deliveries	112	27.8%

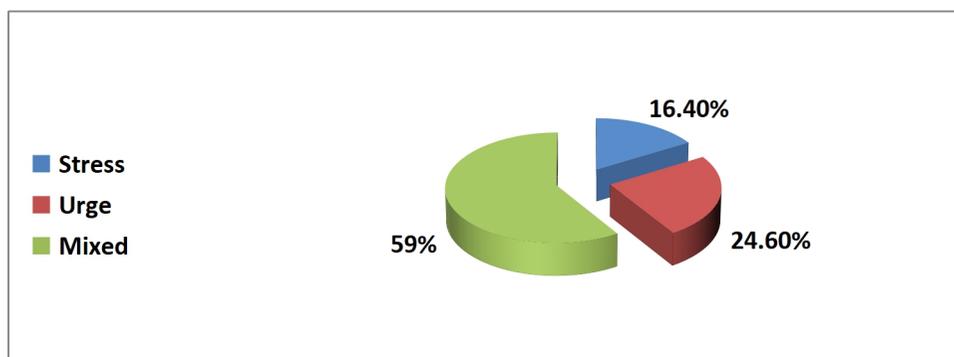


Figure 1: distribution of the studied women according to type of urinary incontinence before training program (n=403).

Table 5: Distribution of the Studied Women According to their Pattern of Urinary Incontinence before and after 3 months from the program (n=403).

Pattern of Urinary Incontinence	Studied women (n=403)				X ²	P-value
	Pre - Test		Post – Test (After 3 months)			
	No.	%	No.	%		
Rate of urine leakage						
Rarely	0	0.0%	150	37.2%	18.58	0.001*
About once a week or less often	54	13.4%	66	16.5%		
Two or three times a week	90	22.3%	86	21.3%		
About once a day	39	9.7%	17	4.2%		
Several times a day	201	49.9%	84	20.8%		
All the time	19	4.7%	0	0.0%		
Amount of urine leakage						
None	0	0.0%	150	37.2%	23.40	0.001*
A small amount	305	75.7%	216	53.5%		
A moderate amount	67	16.6%	37	9.3%		
A large amount	31	7.7%	0	0.0%		
How much does leaking affect daily life						
< 4	26	6.4%	160	39.7%	20.04	0.001*
4-6	60	14.9%	143	35.3%		
> 6	317	78.7%	100	25%		
Severity of urinary incontinence						
Slight	40	10%	54	13.3%	17.33	0.001*
Moderate	289	71.7%	336	83.4%		
Severe	61	15%	13	3.3%		
Very severe	13	3.3%	0	0%		

(*) Statistically significant at $p < 0.05$

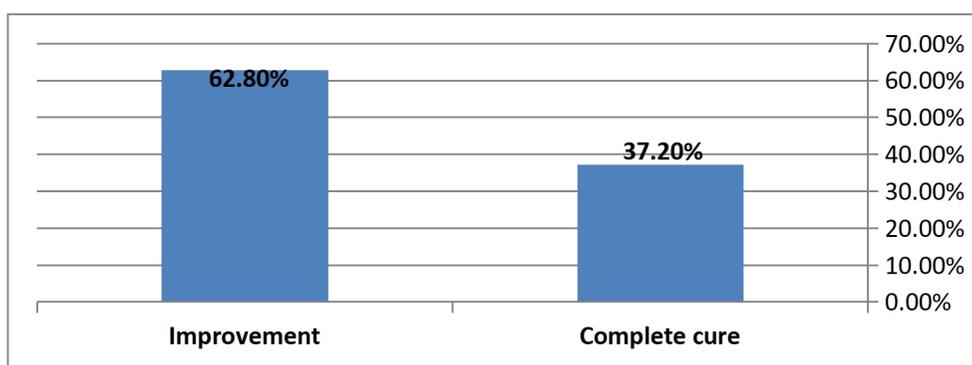


Figure 2 distribution of the studied women according to rate of urinary incontinence after 3 months from the program (n=403).

Table 6: Distribution of the Studied Women According to Impact of Incontinence on The Quality of Life "Short Form (IIQ-7)" before and after 3 months from the program (n=403)

Items	Pre - Test		Post – Test (After 3 months)		χ ²	P-value
	N	%	N	%		
1. Ability to do household chores (cooking, housecleaning, laundry)?						
Not at all	104	25.7%	372	92.3%	1.067	0.001*
Slightly	127	31.4%	31	7.7%		
Moderately	104	25.7%	0	0%		
Greatly	68	17.2%	0	0%		
2. Physical recreation such as walking, swimming, or other exercise?						
Not at all	104	25.7%	367	90.9%	1.389	0.001*
Slightly	92	22.8%	25	6.3%		
Moderately	151	37.5%	11	2.8%		
Greatly	56	14%	0	0%		
3. Entertainment activities (movies, concerts, etc.)?						
Not at all	115	28.5%	376	93.3%	2.722	0.003*
Slightly	69	17.2%	16	3.9%		
Moderately	138	34.3%	11	2.8%		
Greatly	81	20%	0	0%		
4. Ability to travel by car or bus more than 30 minutes from home?						
Not at all	92	22.8%	372	92.3%	0.036	0.01*
Slightly	92	22.8%	25	6.3%		
Moderately	163	40.4%	6	1.4%		
Greatly	56	14%	0	0%		
5. Participation in social activities outside your home?						
Not at all	161	40%	366	90.9%	8.450	0.01*
Slightly	92	22.8%	20	4.9%		
Moderately	115	28.6%	12	2.9%		
Greatly	35	8.6%	5	1.3%		
6. Emotional health (nervousness, depression, etc.)?						
Not at all	46	11.4%	382	94.7%	13.793	0.001*
Slightly	127	31.5%	21	5.3%		
Moderately	104	25.7%	0	0%		
Greatly	126	31.4%	0	0%		
7. Feeling frustrated?						
Not at all	69	17.2%	389	96.6%	18.893	0.01*
Slightly	92	22.8%	14	3.4%		
Moderately	127	31.4%	0	0%		
Greatly	115	28.6%	0	0%		
Total mean score ± SD	76.07±53.06		7.04±9.74		17.633	0.001*

(*) Statistically significant at $p < 0.05$

Table 7: Mean and standard deviation of vaginal digital test and provocation test before and after 3 months from the program among the studied women (N=403)

Vaginal examination test and provocation test	Studied women (n=403)		t	P-value
	Pre - Test	Post – Test (After 3 months)		
	Mean ± SD	Mean ± SD		
Vaginal examination test	1.2±0.4	2.2±0.9	1.125	.000*
Provocation test grade	1.1±0.7	0.5±0.6	1.125	.000*

Discussion:

Urinary incontinence (UI) continues to be an extremely popular cross-cultural and expansive disorder affecting women of all ages. In the Middle East, UI is complained by 20-60% of women. By the year 2018, it was estimated that 423 million individuals worldwide suffer from UI (Nazzal et al., 2020). While UI is not a life-threatening disease, it has an effect on women's general well-being, especially on emotional and social aspects. This lowers the quality of life (QOL) and has been related to several bad results (John et al., 2014). The present research was based on study hypothesis that kegel's exercise training program was significant in improving UI and quality of life on women with urinary incontinence.

According to the current study, body mass index of studied women were obese more than 30 Kg/cm². This might due to obesity considered significant risk factor lead to urinary incontinence. These findings are matching with a multicenter study among the 13,178 women in the United States, United Kingdom, and Sweden which found that 68% of them were overweight/obese, and almost half reported several types of UI (Ferreira et al., 2020). Similarly, Ng et al. (2020) who mentioned that high BMI is correlated with higher mixed UI chances, and leakage drops incontinence alone. Moreover, Hakimi, Aminian, Alizadeh Charandabi, Bastani & Mohammadi (2018) reported substantial correlation

between a greater incidence of urinary incontinence and obesity (higher BMI) .

In the present study, the majority of women had no medical history. However, minority of them suffered from hypertension. Also, great majority of women had no surgical history. However, the least percentage of them had appendectomy and thyroidectomy. This may be due to the fact, that majority of women in middle aged considered to be with good general health perception. Such results are in agreement with Steibliene, Aniuliene, Aniulis, Raskauskiene & Adomaitiene (2020) cross-sectional study on women with stress UI. They reported that majority of women with UI were in middle-aged women (<55 years old) and they were less likely to experience impairment of their general health.

The current study revealed that, almost less than half of studied women had a number of pregnancy three to four times, and delivered previously from three to four times and most of them hadn't previous abortion. This might due to the fact, during delivery pelvic muscle impairment may caused urinary incontinence and advanced prolapse on long term. This finding is relatively just like Sawaqed et al. (2020) who reported urinary incontinence is caused by pregnancy, and there was strong positive correlation between total number of pregnancies and urinary incontinence. Similarly, another study among Turkish women found urinary incontinence is greater in women with episiotomy.

Nevertheless, episiotomy can avoid perineal laceration effectively by relaxing the pelvic floor (**Kasikci et al., 2015**).

Regarding mode of delivery, about two third of the studied women delivered cesarean deliveries and about one third delivered vaginal deliveries. This might due to the fact that, caesarean delivery is more common among women today and also it has significant effects on urinary incontinence. These results are supported by **Sadiq & John (2020)** who were found that mode of delivery has significant impact on women life as there is increased likelihood of urinary incontinence and fecal incontinence in women undergoing vaginal delivery. Moreover, another study conducted in Ain Shams university maternity hospital by **El-Sokkary, Wahba, El-Shahawy, Fathy, El-Shourbagy & Raouf (2015)**, who were concluded that both vaginal delivery and caesarean section (CS) did not reduce the risk of urinary and fecal incontinence.

Regarding type of urinary incontinence, more than half of studied women had mixed type, about one quarter had urge type and less than one fifth of women had stress type of urinary incontinence. Such results are in agreement with **Gomes, de Arruda Faber, Botta, Brito & Juliato (2020)** study that reported that majority of women (69.1 percent) had mixed UI, then urge and stress UI. Opposite to, **Jain, Mathur, Choudhary & Choudhary (2020)** found that stress incontinence was found to be the highest (74.1%), followed by mixed incontinence (25.84%). This was similar to the Chaandini study in which stress UI (43%) was the commonest type followed by mixed type of UI (25%) (**Jayachandran, 2007**).

The difference between present study and previous mentioned studies might be due to participants' different

characteristics (as mean age, number of pregnancy and childbirth, in addition to obesity according BMI), study setting and methodological differences. Furthermore, **Singh, Agarwal and Verma (2013)** stated that in women over 40 years of age, all forms of urinary incontinence have been found to be substantially greater.

The current study results revealed that after three months from program implementation more than one third of studied women never had urine leakage and complete cure, while more than two third of women had improved. In this context, **Price, Dawood & Jackson (2010)** reported in patients who received behavioral therapies there are substantial cure rates, and reduction of incontinence episodes. **Reff (2007)** found that 46.2% of the enrolled patients served participants who were a continent. **Prudencio et al. (2014)** discovered that 43.7 percent of cases displayed urinary continence. **Seidel (2007)** estimated that it is possible to cure or boost about 80 percent of patients with incontinence.

The difference in results may be due to treatment of associated factors, and higher number of sessions over six months intervention in the study of **Prudencio et al. (2014)** compared to three months intervention program in this study, in addition to cultural difference and educational level of the women.

Regarding impact of urinary incontinence on quality of life, the current study findings showed that a negative impact of urinary incontinence on quality of life at pre program phase and show a highly statistically significant improvement in the post program in regard to household chores, physical recreation, entertainment activities, ability to travel by car or bus more than 30 minutes, participation in social activities outside home and emotional health. This might

due to women committed and bound themselves to do kegel exercise, which led to an improvement in the severity of urinary incontinence symptoms and thus an improvement in overall quality of life.

This is matching with **Fitz, Paladini, de Azevedo Ferreira, Gimenez, Bortolini & Castro (2020)** who observed a substantial reduction in the average QOL different domain scores in the post-program period. This goes in same line with **Sawaqed et al. (2020)** who stated that, emotional effect is highly influential on UI patients. It influence their total QOL by restricting their public interaction, their dress, travel distance, and many other everyday life factors that women on the continent will not care about. In addition to **Gomes et al. (2020)** who mentioned that there is association between UI and poor quality of life is associated.

The current study results revealed that there was significantly higher in vaginal examination test score and lower provocative test score at post test phase compared to preprogram phase. This is supported by, **FitzGerald et al. (2007)** who reported that vaginal examination testing and provocation tests are valuable in assessing pelvic floor muscle intensity. These findings were also in accordance with **Sharaf et al. (2010)**, who stated that more than third of patients who completed the exercise regime, pelvic floor muscle assessment had prompt substantial enhancement in these muscles tone.

Study result is opposite to **Wang and Ying (2009)** results that there is poor statistical significance difference in pelvic floor muscle strength calculated by vaginal examination testing and provocative testing for management of UI after pelvic floor muscle training (PFMT). He also stated that, short-term PFMT did not dramatically enhance the tone of PFM in UI patients. The difference between the

two may be due to the fact that, the daily kegel exercises performance for 4-6 weeks improve urethral resistance that consider a closing pressure on the urethra and enhances support to pelvic structures over time and increase pelvic muscles strength. Therefore, pelvic floor muscles strength helps to protect bladder, reducing urination frequency and urgency. (**Fitz et al., 2020**).

Bø and Hilde (2013) also stated that kegel exercises provide better support for the minor pelvic organs, boost rest pressure in the urethra, elongate the urethra's functional length, turn negative pressures in the urethra into positive during an increase in intra-abdominal pressure, activate the peri-urethral striated muscles as a result of increased tension at rest of the anus levator, normalisation of the reflex of the abdominal crotch in response to increased intra-abdominal pressure, and improvement in the receipt during intercourse of sensory stimuli from the vagina.

Moreover, **Pal (2014)** presented evidence that kegel exercises are successful to manage urinary incontinence women and better than no treatment because the outcome variables showed excellent results for decreasing the frequency of urinary incontinence and relieving its symptoms.

Women undergoing kegel exercise training were seven times more likely to be healed of urinary incontinence than those with no treatment. Training in kegel exercises has proven to be an effective treatment for UI female. It has no side effects and, compared to surgery, it is cost-effective (**Toos, Youssef, El-Bandrawy & Bahaa, 2019**).

Conclusion:

It is concluded that; kegel exercise training program has a positive impact on improving quality of life and urinary incontinence among women.

Recommendations:

Apply pelvic muscle exercise guideline in all outpatient gynecological clinics for all women with urinary incontinence. Health education program about misconception corrections regarding urinary incontinence among incontinent women in health care centers for earlier intervention.

Conflict of interest:

There is no conflict of interest and no fund from any institution.

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