

Effect of Kegel Exercise on Urinary Incontinence among Institutionalized Elderly in Lattakia, Syria

Fatima Adnan Hallaj, Lecturer
Faculty of Nursing, Tishreen University-Syria

Abstract

Urinary incontinence is a prevalent, costly, yet ignored problem among elderly. Kegel exercise is an effective, non-harmful, of very low complication rates, and a very highly successful treatment for urinary incontinence. **Objective:** To determine the effect of Kegel exercise on urinary incontinence among institutionalized elderly in Lattakia, Syria. **Setting:** The study was carried out in the three available residential homes for elderly people in Lattakia, Syria. These were Dar Al Raha, Dar Al Mowasat, and Dar Al Ber. **Subjects:** The study comprised 30 elderly persons with urinary incontinence. They were divided randomly to two equal groups (group -1-: experimental group and group -2-: control group. Elders in group -1- performed the Kegel exercise for three months in four sessions per day for fifty contractions (5 seconds for each contraction) followed by fifty resting phases (10 seconds for each one) in each session with a total of 200 contractions per day. Elders in group -2- were left to their routine treatment. **Tools:** Participants were interviewed individually to collect the necessary data using a structured interview sheet and the revised urinary incontinence scale (RUIS) which was repeated after 3 months for both the control group and those who performed Kegel exercise to evaluate its effect on the urinary incontinence status. **Results:** The Kegel exercise had a positive effect on the urinary incontinence status of elders who practiced it. Four of the 15 (26.7%) elders in group 1 were cured completely and five (35.7%) showed improvement in their symptoms. Among the control group the condition of four elders worsened (26.7%) while for the rest the condition did not change. This improvement was related significantly with age, gender, duration of stay in the home, and incontinence duration. **Conclusion:** The Kegel exercise improved urinary incontinence status significantly. **Recommendations:** Early identification of elders with urinary incontinence. Educate and motivate elders with urinary incontinence to perform Kegel exercise regularly in order to improve their condition.

Introduction

Urinary incontinence is a major health problem that affects 50 – 70% of the institutionalized elderly and up to 30% of all elders^(1,2). It occurs more frequently in women, the female to male ratio being 2:1^(3,4).

A persistent myth is that incontinence is a natural part of aging, but the cause of incontinence is often multi-faceted and has many combined factors. These factors include age related changes in the urinary system, genetic factors, pregnancy, delivery and history of hysterectomy, hormonal

status and menopause, previous surgery, muscle dysfunction or weakness, physical injury or medication, body mass index, smoking, and constipation^(3,5). Moreover, inactivity and relocation in an elderly home also puts the elder at risk. Studies revealed that at least one third of the institutionalized elders suffer from urinary incontinence^(6,7).

Elders with incontinence experience more urinary tract infections, pressure ulcers and falls,^(8,9) in addition to embarrassment, avoidance of physical activity, increased dependency, social isolation, depression, increased morbidity and mortality, and financial burden. This in

turn will influence the elders' quality of life⁽⁹⁻¹¹⁾.

In the past, surgery was the main line of treatment for elders suffering from urinary incontinence, whilst nowadays, conservative management has been considered the first line of treatment for uncomplicated urinary incontinence. Kegel exercise (pelvic floor muscle training) was documented as an effective preventive tool and also for conservative treatment of urinary incontinence⁽¹²⁻¹⁴⁾. It was considered as a cost-effective, noninvasive treatment for urinary incontinence, and has been reported to have 30–90% success and very low complication rates^(3,15-17).

The pelvic floor refers to the complex of connective tissues and muscles that close off the pelvic outlet and act as a "floor" to the abdominopelvic cavity. The external sphincter of the urethra and the anal sphincter are in continuity with these muscles⁽¹⁸⁻²⁰⁾. So, strengthening the pelvic floor musculature by systematic contraction and relaxation of the pubococcygeus muscle has been prescribed to help in prevention and treatment of urinary incontinence^(21,22). Many studies concluded that Kegel exercise should be the first-line conservative management of stress, urge and mixed urinary incontinence⁽²³⁻²⁵⁾.

The protocol for performing Kegel exercises varies from study to study; however, it is prescribed to start with four sessions per day with ten contraction times in each session; and a total of forty contraction times per day. This is to be increased to reach fifty contraction times in each session with a total of two hundred contraction times daily for at least three months to notice significant improvement^(13,26-28).

The gerontological nurse plays an important role in the detection of the urinary incontinence and in the enhancement of the quality of incontinence care for elders through the comprehensive assessment and motivating the urinary incontinent elders to

perform the Kegel exercise to cure or at least improve their symptoms. In this respect the nurse should teach the elder how to perform the Kegel exercise correctly and evaluate the improvement^(23,29).

Studies about Syrian elderly population and their health problems in the community and in institutions are still scarce. Although the evidence shows clearly that if urinary incontinence is ignored, the quality of life will be worse. No or little attention is given to this problem in Syria. So, this study is needed to draw additional document on Kegel exercise as an effective treatment of urinary incontinence among this population.

Aim of the Study

The aim of this study is to determine the effect of Kegel exercise on urinary incontinence of institutionalized elderly in Lattakia, Syria.

Materials and Method

Materials

Design: Quasi experimental study.

Setting: The study was carried out in the three available residential homes for elderly people in Lattakia, Syria. These were Dar Al Raha, Dar Al Mowasat, and Dar Al Ber. These are affiliated to social associations under the supervision of the Directorate of Social Security in Lattakia, which is under the Ministry of Social Security. These homes are sponsored by charities and donors. The services provided to the residents include housing, feeding, health and recreational services. The services in these homes are paid for those who can afford and free for those who cannot afford. The recreational activities include parties and trips. The admission requirements to these homes are age 60 years old and more and freedom from mental and communicable diseases.

1- Dar Al Raha: It is affiliated to the Association of Rural Christian Al Rahma in Lattakia which depends on the endowment of donors. It accepts both male and female elders. The total number of residents that can accommodate is 47 elders.

The home building consists of three floors and a garden. In the ground floor there is the kitchen and laundry room, living and dining room, toilet, and the manager room. Each of the other three floors comprises a kitchenette and eight rooms each with a private bathroom. The number of elders in each room is either 1 or 2.

The working force is composed of a manager, with a university education, and five caregivers (three of them are educated with a preparatory degree and the other two can hardly read and write). None of the caregivers is qualified in giving care to elders. A doctor visits the home once per week to provide medical and follow up care for those who are in need. In case of emergency the elders are transferred to a governmental or private hospital according to their economic status.

2- Dar Al Mowasat: It is affiliated to the Association of Al Mowasat in Lattakia which depends on charities and donations. It accepts only female elders and can accommodate up to 51 elders.

The home building consists of four floors. Each floor consists of a living room, four rooms, bathroom, and toilet. The number of elders in each room varies between one and four. The kitchen and laundry room are on the first floor.

Caregivers are unqualified in giving care to elders. The staff who supervises the home consists of a manager with university education and ten workers only two of them have secondary education and one with primary education and the rest seven can hardly read and write. A doctor visits the elders once per week for medical check up, and provision of required care. In the case of emergency needs the elders are transferred to a governmental hospital.

3- Dar El Ber: It is affiliated to the Association of Al Ber and Social Services

in Lattakia which depends on charities and donors. It accepts only male elders and can accommodate up to 44 elders.

The home building consists of two floors and a garden. The first floor includes the kitchen and laundry room, and each floor consists of four rooms, bathroom, and toilet. The number of elders in each room varies between 2 and 7.

Caregivers are illiterate and unqualified to give care to elders. The home supervisors include a manager with secondary education and six workers, only two of them can read and write. Two doctors visit the elders once per week, and in case of emergency the elders are transferred to a governmental hospital.

Subjects: The study subjects amounted to 30 elderly of both genders residing in the previous settings and fulfilling the following criteria: age 60 years and more, diagnosed as having stress, urge or mixed urinary incontinence, able to move without assistance, mentally capable of understanding and performing the Kegel exercise, and agree to participate in the study.

Tools: Two tools were used to collect the data:

Tool I: Socio-demographic and clinical data structured interview schedule

It was designed by the researcher after thorough review of literature and included:

Data about the incontinent elders:

1- Socio demographic characteristics of the elders such as age, gender, social status, level of education, occupation before retirement, duration of stay in the home.

2- Health history: type of urinary incontinence, its duration, presence of other chronic diseases and physical limitation that might affect reaching toilet on time, and the medication used.

Tool II: The Revised Urinary Incontinence Scale (RUIS)

The scale used in this study to assess the urinary incontinence symptoms was developed by Sansoni et al. (2011)⁽³⁰⁾. It includes 5 items that investigate the urine leakage related to the feeling of urgency, urine leakage related to physical activity and coughing or sneezing, small amounts of urine leakage (drops), number of urine leakage, and amount of urine loss each time. The maximum score is 16. The state of urinary incontinence is evaluated according to the score obtained in the following manner:

- < 4 no urinary incontinence
- 4 – 8 mild urinary incontinence
- 9 – 12 moderate urinary incontinence
- ≥ 13 severe urinary incontinence

Development of Kegel exercise Program:

This was developed by the researcher after review of relevant literature. The elders practice the Kegel exercise for 3 months in 4 sessions per day for 50 contraction times (5 seconds for each contraction) followed by 50 resting phases (10 seconds for each one) in each session. (200 contraction times per day). The duration of each session was about fifteen minutes.

Method

- 1- The official approvals from the competent authorities to carry out the study were obtained.
- 2- Informed consent of the elders to participate in the study was obtained after explanation of the purpose of the study.
- 3- The study tools were validated by five experts in the field of the study. Arabic translation of tool II (the revised urinary incontinence scale (RUIS) was done by the researcher, validated and tested on 20 elders for its reliability using test retest method (after 2 weeks). Spearman's

correlation coefficient for RUIS was $r= 0.95$.

- 4- A pilot study was conducted on five elders selected from Dar Al Raha to test the study tools. They were excluded from the study. The necessary modifications were made based on the results of the pilot study.
- 5- All residents in the three homes (142) were surveyed to identify those fulfilling the study criteria. Those who have urinary incontinence were 42 (29.58%) elders, 6 of them refused to participate in the study. From the remaining the researcher selected 30 elders randomly by ballot to participate in the study.
- 6- The selected elders were assigned randomly to two equal groups of 15 elders (group -1-: experimental group – group -2-: control group).
- 7- Each elder included in the two study groups was interviewed individually to assess the urinary incontinence status using the two study tools.
- 8- The elders in group-2- (control group) were left to their routine treatment. Elders in group-1- (the experimental group) were given the Kegel exercise.

Application of Kegel exercise for group-1-

- After the pre assessment of the elders' urinary incontinence status, the elders were taught the Kegel exercise to be performed in the following three months .

In addition, the researcher explained the precautions to be undertaken during performing the Kegel exercise to ensure and maintain the elder's safety such as the elder should be fully clothed, and his bladder always empty before doing the Kegel exercise, always to remember that when contracting the pelvic floor muscles, the muscles in the abdomen, back, buttocks, and sides should

remain loose (example: not to use the stomach or leg muscles, and not to cross the legs or hold the breath during the exercise). Finally, not to overdo the Kegel exercises. If the muscles work too hard, they will become tired and unable to fulfill their necessary functions. If pain is felt in the abdomen or back after a Kegel exercise session, it's a sign of not doing it correctly .

In three sessions, the researcher taught the elders how to exercise the muscles properly, then she reviewed the information taught and asked the elders to ensure that they understand how to perform Kegel exercise correctly. The Kegel exercise group (group-1) was divided into four sub-groups. Each sub-group consisted of 3-4 elders. The elders practiced the Kegel exercise in groups. They performed the Kegel exercise gradually, where in the first day they performed the Kegel exercise in one session for ten contraction times (5 seconds for each one) followed by ten resting phases (10 seconds for each one) with a total (10) ten contraction times per day. Then the number increased to reach four sessions for ten contraction times (5 seconds for each contraction) followed by ten resting phases (10 seconds for each one) in each session with a total (40) forty contraction times per day. Then according to the elders tolerance the number was increased in each day for 10 contraction times in each session until they reached 200 contraction times per day. The duration of each session was about 15 minutes.

Methods used in teaching:

- Demonstration and active participation of the researcher with the participants in the different sessions by using pictures.
- Redemonstration by the participants.

- Handouts to explain the position and how to perform the Kegel exercise were given freely to the participants to attract their attention, motivate them and help to refresh their memory.
- The exercise was implemented in groups to encourage and motivate the participants.
- The Kegel exercise was repeated for two hundred times in four sessions per day. The elders performed fifteen contraction times in each session (15 minutes).
- In order to encourage and motivate the elders to participate and continue all the sessions small presents were offered by the researcher after each session.

Evaluation of the Kegel exercise:

After the implementation of the Kegel exercise (for three month) each elder in the two groups (experimental and control) was reassessed using the tool II (Revised Urinary Incontinence Scale "RUIS").

Data collection started from the first of May 2013 to the end of October 2013 (6 months).

Ethical considerations:

- Consent of the participants was obtained before starting data collection and after explanation of the importance and benefits of the study.
- Confidentiality of the collected data was assured.
- Elders were assured that the Kegel exercise does not have any harmful effect.
- Elders were informed about their right to refuse or withdraw from the study anytime without penalty.

Statistical Analysis

- A chi-square test was used to study the relationship between two categorical variables.

- The Fisher's exact test was used when one or more of cells had an expected frequency of five or less.

- An independent sample t-test was used to compare the means of a normally distributed variable for the two independent groups.

- The Wilcoxon-Mann-Whitney test was used when the dependent variable was not normally distributed.

- Statistical analysis was performed using Stata (version 6).

- P value less than 0.05 was considered to be statistically significant.

Results

The 30 elders who participated in the study were 7 (23.3%) from Dar Al Ber, 13 (43.34%) from Dar Al Mowasat and 10 (33.33%) from Dar Al Raha.

Table (1) shows the socio-demographic characteristics of the elders. No significant difference was found between the study and control groups with respect to socio-demographic characteristics. The age of the elders ranged from 63 to 82 years. The mean age of the control group was 72.27 ± 4.38 years and that of the experimental group was 73.20 ± 5.57 years. Two thirds (66.67%) of each of the two groups were females. All the study subjects in both groups received education. Two thirds (66.67%) in each of the two groups had up to preparatory level, 13.3% of the controls, and 20.0% of the experimental had secondary, and the rest had higher education (13.33% and 20.0% of the experimental and control groups respectively). Two fifths in the two groups (40.0% control, 40.0% experimental) depended on social affairs as a source of income.

Table (2) shows the health profile of elders in the two groups. No significant difference was found between the study and control groups with respect to health profile. It appears from the table that 26.66 % in each of the study and control groups reported having no chronic diseases, while the rest in both groups reported musculoskeletal disorders (40.0% and 46.67% respectively); GIT disorders (33.33% and 40.0% respectively); metabolic disorders as DM (20.0% and 26.67% respectively); and respiratory disorders (6.66% and 13.3% respectively). The table also shows that 53.33% in the study group and 40.0% in the control group did not take any medication, while the rest in both groups reported taking analgesics (40.0% and 46.67% respectively); hypoglycemic (20.0% and 26.67% respectively); antibiotic (6.66% and 13.33% respectively); and antihistamine medications (6.66% and 13.33% respectively).

Table (3) shows the distribution of elders by the duration of stay in the home. It appear from the table that for one third (33.3%) the duration of stay in the elderly home was 5 to less than 10 years, for 14 (46.7%) it was less than 5 years and only for 4 (13.3%) it was 10 or more years. It appears from the table 93) that the duration of incontinence was 3 or more years for 56.67% of the elders. Those who reported incontinence for less than 3 years amounted to 43.33%.

As regards the amount of fluid consumed per day the table shows that 70.0% of the elders consumed at least one liter or more fluid/day and for the rest (30.0%) it was less than the recommended daily amount (i.e., less than 1 liter/day).

All elders in Dar Al Ber and Dar Al Mowasat reported constraints in the environment either toilets being faraway from their bedrooms, or toilets being of insufficient number, unsuitable height, or lighting at night is inadequate, and absence of in-service call system. Although elders in Dar Al Raha had private bathrooms, yet the

only constraint reported was the absence of in-service call system.

Table (4) shows the mean score of the urinary incontinence status of the elders in both groups before and after 3 months. Applying the Revised Urinary Incontinence Scale on both groups before and three months after the implementation of the exercise program the table shows improvement in the mean score (decreased) from 10.7 to 8.4 in the Kegel exercise (experimental) group while in the control group it became worse (increased) from 9.9 to 12.2. The difference between the mean change in the two groups is statistically significant ($P=0.0001$).

Table (5) applying the Revised Urinary Incontinence Scale on the experimental group before and after three months from the implementation of Kegel exercise program the table shows that all elders with mild urinary incontinence before the implementation of Kegel exercise recovered completely after the program and 80.0% of those with moderate state showed improvement in their symptoms after the program where they became mild, and only 16.67% of those with severe state turned to the moderate state after the program. These differences are statistically significant ($P=0.0001$).

Table (6) applying the Revised Urinary Incontinence Scale on the control group immediately after selection and three months later the table shows no improvement in their symptoms. On the contrary, the condition worsened in many of them. Among the 5 elders with mild state of incontinence two became worse after three months, one turned to moderate state and one to severe state. Also, two of the 5 (40.0%) of those with moderate state changed to the severe state after three months and all those with severe incontinence continued to be so.

Table (7) shows the relation between the elders' characteristics among Kegel exercise group and the changes in urinary

incontinence status after the implementation of the kegel exercise. The improvement in the symptoms among elders who performed the Kegel exercise was significantly associated with gender, age, duration of stay in the home, amount of fluid intake per day, and comorbidities, and the duration of the urinary incontinence ($P=0.0109$, $P=0.0207$, $P=0.0180$, $P=0.0075$, $P=0.0577$, $P=0.0113$ respectively).

Discussion

Urinary incontinence, being common among elderly people, is a social embarrassing condition leading to withdrawal from social activities, depression, dependency and poor quality of life. Different modalities have been adopted for the management of urinary incontinence. Among these is the pelvic floor muscle exercise (Kegel exercise) which is one of the most effective methods for the conservative management of urinary incontinence. Therefore, the study aimed to determine the effect of Kegel exercise on urinary incontinence status of institutionalized elderly in Lattakia, Syria.

The study findings revealed significant improvement in the urinary incontinence status of the elders after performing Kegel exercise for three months where half of them showed improvement and a quarter were either completely cured or showed improvement in their symptoms. While among the control group the symptoms became worse (**Tables 4, 5 and 6**). This is because elders who performed the Kegel exercise had a greater sphincter control and mastery of bladder control until they reached the toilet access, as well the number and amount of urine lost each time decreased. Also, they were more able to use their muscles in a functional manner such as "squeezing" while coughing or sneezing and had no urine leakage or decrease in its time and amount. Also, there was a decrease in the frequency and number of incontinence and drenches. This improvement may be

attributed to the effect of the Kegel exercises which strengthen the voluntary pelvic floor muscles that is in continuity with the external sphincter of the urethra so it tightens the muscles used to stop the stream of urine and help control the urethra sphincter and improve coordination that assist in bladder continence which in turn help in improving or in some cases completely regain bladder control. Moreover, the powerful contractions of pelvic floor muscles training enabled the elders to use their muscles in a functional manner such as "squeezing" while coughing or sneezing where it may increase the capacity to exert pressure against the urethra, and therefore, increases intra urethral pressure, and prevents the urine leakage during an increase in the intra abdominal pressure and in turn decreases the number of involuntary urine leakage episodes. The results of this study support the findings of some studies^(3,13,15).

Among the Kegel exercise group, all elders with mild state of incontinence recovered completely and the majority of those with moderate state showed improvement in their symptoms and only a few from those with severe state improved (**Table 5**), while in the control group no improvement was observed and for one of them the condition became worse (**Table 6**). One can notice that Kegel exercise could cure or at least prevent the condition from getting worse. This probably may be due to the fact that Kegel exercise improves significantly the pelvic floor muscle strength and develops a greater sense of control and mastery of the bladder. As for those with severe urinary incontinence status, they may require longer period of exercise and in case of failure surgical restoration may be required. The same findings were reported in other studies^(3,11,14).

Significant improvement in symptoms of urinary incontinence was observed clearly among males practicing Kegel exercise after the exercise sessions in

comparison with females (**Table 7**). This is probably due to hypoestrogenism after menopause in women and the weakness in pelvic muscles as a result of the pregnancy and delivery which worsen the urinary incontinence state and may need a longer period to exercise to get the needed effect. This supports the findings of another study⁽⁵⁾.

The age of the elders affected significantly the changes in urinary incontinence status, among the experimental group before and three months after performing regularly the Kegel exercise where the younger the age the better the results (**Table 7**). This is probably because of the effect of the aging process on the urinary system leading to decrease bladder capacity, poor bladder contractility, increase of residual urine, weakness of pelvic floor muscles, reduced number of the sensory nerves and sensory receptors that provide signals of bladder filling, and prostate enlargement in men. All these changes increase the risk for urinary incontinence and this risk increases with age. The same was reported in two other studies done in Belgium (2000)⁽³¹⁾ and in Iran (2014)⁽¹⁵⁾.

Furthermore, the study revealed that the shorter the duration of stay in the residential home the more the improvement in the urinary incontinence symptoms among the elders performing Kegel exercise (**Table 7**). This may be explained by the fact that the increase duration of stay in the elderly home is usually associated with many problems such as depression which affects elder's ability to respond to the demands of the bladder and in turn worsens the incontinence status. This is in addition to many environmental factors which may aggravate the condition. In the studied homes, toilets were found to be poorly designed to suit the elderly i.e. being too low, (with no elevated toilet seat) not close to the elders' rooms and being insufficient in number. Moreover, the presence of long corridors, poorly marked doors, the inadequate lights, the high level of beds, the

cold weather and inadequate heating, and the absence of in-service call system are all factors affecting the progress of incontinence status (**Table 7**). This supports other studies^(32,33).

The amount of fluid taken by elders improved significantly the urinary incontinence symptoms (**Table 7**). Those who consume the recommended amount of fluid/day (at least one liter/day) showed better improvement in urinary incontinence symptoms than those who did not. This may be attributed to the fact that low fluid intake increases risk for constipation which in turn increases risk for urinary incontinence. This result is in line with other studies^(5,26).

Findings of the present study indicate that the incontinence duration had a significant relation with the urinary incontinence status after performing the Kegel exercise sessions. The shorter the duration (less than 3 years) the better the results because urinary incontinence itself has adverse effects on the urinary system such as urinary tract infection which affords risk for further incontinence. Thus, the incontinence usually worsens with the increase in the duration of the problem and this may need a longer period of exercise to be effective. The same findings were reported in other studies^(12,16).

Limitations of the study:

- Some elders refused to join in the exercise sessions, believing that it is of no benefit and dangerous. Their number amounted to 6 elders.
- Two elders withdrew from the exercise sessions and refused to complete the sessions. These were replaced by other residents to maintain the sample size.

Conclusion

It can be concluded from the study that the Kegel exercise has a positive effect on the urinary incontinence status of the

elders leading either to its cure or at least improving the symptoms. This improvement is significantly affected by many factors such as age, gender, duration of stay in the residential home, amount of fluid intake per day, and incontinence duration.

Recommendations

1. In order to achieve better results, assessment of elders residing in the elderly homes is required to detect early those who have urinary incontinence, and to encourage them to perform Kegel exercise as early as possible. This will help in achieving better results.
2. It is imperative that elders with urinary incontinence continue to perform Kegel exercise to maintain the effective muscle function and symptom resolution.
3. Elders suffering from urinary incontinence should be placed in rooms near the toilets. This will help them to reach the toilets quickly and avoid dripping of urine. High toilet seats and hand bars beside toilets are required to help elders to use them safely.
4. Caregivers should be taught about the importance, technique and duration of Kegel exercise to be able to teach, encourage and motivate the elders suffering from urinary incontinence to perform the Kegel exercise correctly.
5. Follow up of elders to assess progress of their condition and give appropriate instructions to achieve better quality of life.

Table (1): Distribution of elders in the experimental and control groups according to their sociodemographic characteristics.

Sociodemographic Characteristics	Experimental group		Control group		Significant
	NO. n=15	% 100	NO. n=15	% 100	
- Age (in years):					P=0.61
• 60 –	4	26.67	3	20.0	
• 70 –	10	66.66	11	73.33	
• ≥ 80	1	6.67	1	6.67	
Mean ± SD	73.20 ± 5.57		72.27 ± 4.38		
- Sex:					P=1
• Female	10	66.67	10	66.67	
• Male	5	33.33	5	33.33	
- Educational Level:					P=0.82
• Up to preparatory	10	66.67	10	66.67	
• Secondary	3	20.0	2	13.33	
• Higher education	2	13.33	3	20.0	
- Source of income:					P=0.89
• Social affairs	6	40.0	6	40.0	
• Pension	5	33.33	6	40.0	
• Relative and friends	4	26.67	3	20.0	

* Significant $P \leq 0.05$ **Table (2): Distribution of elders in the experimental and control groups according to their health profile.**

Health Profile	Experimental group		Control group		Test of Significance
	NO. n=15	% 100	NO. n=15	% 100	
- Vision disorders:					P=0.71
• No	10	66.67	9	60.0	
• Yes	5	33.33	6	40.0	
- Diseases (other than UI): #					P=1 P=0.71 P=0.71 P=0.67 P=0.54
• None	4	26.66	4	26.66	
• Musculoskeletal disorders	6	40.0	7	46.67	
• GIT disorders	6	40.0	5	33.33	
• Metabolic disorders (DM)	3	20.0	4	26.67	
• Respiratory disorders	1	6.66	2	13.33	
- Drugs: #					P=0.46 P=0.71 P=0.67 P=0.54 P=0.54
• None	8	53.33	6	40.0	
• Analgesics	6	40.0	7	46.67	
• Hypoglycemic	3	20.0	4	26.67	
• Antibiotic	1	6.66	2	13.33	
• Antihistamine	1	6.66	2	13.33	

* Significant $P \leq 0.05$

More than one answer

Table (3): Distribution of elders according to the duration of stay in the residential homes, incontinence duration and amount of fluid intake.

Elders' characteristics	NO. n=30	% 100
Duration of stay in the home (in years)		
• < 1	2	6.7
• 1-	14	46.7
• 5-	10	33.3
• ≥ 10	4	13.3
Incontinence duration (in years)		
• < 3 years	13	43.33
• ≥ 3 years	17	56.67
Amount of fluid intake/day		
• < 1 liter	9	30.0
• ≥ 1 liter	21	70.0

Table (4): Mean score of urinary incontinence status of elders in both groups before and after three months from the implementation of the exercise program.

Mean score urinary incontinence status using the RUIS# (total score 16)	Experimental group	Control group	P value
	Mean ± SD	Mean ± SD	
- Before	10.7 ± 3.9	9.9 ± 3.9	
- After 3 months	8.4 ± 6.1	12.2 ± 4.4	
Mean change ± SD	2.27 ± 2.49	-2.33 ± 2.44	P=0.0001*

* Significant $P \leq 0.05$

Revised Urinary Incontinence Scale

Table (5): Distribution of elders in the experimental group according to the severity of urinary incontinence before and 3 months after the implementation of the Kegel exercise.

Urinary incontinence status using RUIS			Urinary incontinence status after 3 months (n.=15)								P value
			No		Mild		Moderate		Severe		
			No.	%	No.	%	No.	%	No.	%	
Urinary incontinence status before	Mild	No. n=4	4	100.0							P=0.0001*
	Moderate	No. n=5			4	80.0	1	20.0			
	Severe	No. n=6					1	16.67	5	83.33	

* Significant $P \leq 0.05$

Table (6): Distribution of elders in the control group according to their urinary incontinence severity status.

Urinary incontinence status using Revised Urinary Incontinence Scale (RUIS)			Urinary incontinence status after 3 months						P value
			Mild		Moderate		Severe		
			No.	%	No.	%	No.	%	
Urinary incontinence status on admission	Mild	No. n=5	3	60.0	1	20.0	1	20.0	P=0.018*
	Moderate	No. n=5			3	60.0	2	40.0	
	Severe	No. n=5					5	100.0	

* Significant $P \leq 0.05$ **Table (7): Relation between the elders' characteristics of the experimental group and the changes in urinary incontinence status before and after the Kegel exercise program.**

Elders' characteristics	Experimental group		P value
	Before	After	
	Mean score \pm SD	Mean score \pm SD	
- Sex:			
• Female	10.4 \pm 4.39	9 \pm 6.6	P=0.2228
• Male	10.8 \pm 3.88	8.1 \pm 6.24	P=0.0109*
- Age in years:			
• < 75	8.13 \pm 3.31	4.75 \pm 5.63	P=0.0207*
• \geq 75	13.57 \pm 2.07	12.57 \pm 3.6	P=0.2114
- Duration of stay in the home:			
• < 5 years (n.=16)	7.29 \pm 2.5	3.29 \pm 4.11	P=0.0180*
• \geq 5 years (n.=14)	13.63 \pm 1.92	12.88 \pm 3.44	0.3827
- Amount of fluid intake / day:			
• < 1 liter (n.=4)	14 \pm 2.16	13.5 \pm 3.79	P=0.8415
• \geq 1 liter (n.=11)	9.45 \pm 3.72	6.55 \pm 5.85	P=0.0075*
- Presence of associated diseases:			
• Yes	11.73 \pm 4	10.09 \pm 5.94	P=0.0577*
• No	7.75 \pm 1.5	3.75 \pm 4.35	P=0.0679
- Incontinence duration:			
• < 3 years (n.=8)	8 \pm 2.93	3.88 \pm 4.19	P=0.0113*
• \geq 3 years (n.=7)	13.71 \pm 2.29	13.57 \pm 2.99	P=0.8575

* Significant $P \leq 0.05$

References

1. El Rahman R. A study of urinary incontinence in elderly. Unpublished Master Thesis. Faculty of Medicine, Alexandria University, 1997.
2. Griebing T. Urinary incontinence in the elderly. *Clinics in Geriatric Medicine* 2009; 25 (3): 445- 57.
3. Kashanian M, Ali S, Nazemi M, Bahasadri S. Evaluation of the effect of pelvic floor muscle training (PFMT or Kegel exercise) and assisted pelvic floor muscle training (APFMT) by a resistance device (kegelmaster device) on urinary incontinence in women: a randomized trial. *European Journal of Obstetrics & Gynecology and Reproductive Biology* 2011; 159 (5): 218- 23.
4. Benedetto P, Coidessa A, Floris S. Rationale for pelvic floor muscles training in women with urinary incontinence. *Minerva Ginecol* 2008; 60(6): 529–41.
5. Australian Government. The impact of commonly used medicines on urinary incontinence. University of South Australia, 2011. Available at: www.veteransmates.net.au
6. Fong E, Nitti V. Urinary incontinence. *Primary Care: Clinics in Office Practice* 2010; 37 (3): 599- 612.
7. Fouad R. Factors related to urinary incontinence among institutionalized elderly. Unpublished Master Thesis. Faculty of Nursing, Alexandria University, 2000.
8. Tannenbaum C, Perrin L, Dubeau C, Kuchel G. Diagnosis and management of urinary incontinence in the older patient. *Archives of Physical Medicine and Rehabilitation* 2001; 82 (1): 134-8.
9. Long R, Giri S, Flood H. Current concepts in female stress urinary incontinence. *The Surgeon* 2008; 6(6): 366-72.
10. Wagg A. Evidence – based physical therapy for the pelvic floor. 2nd ed. New York: Elsevier, 2014; 369- 85.
11. Kim H, Yoshida H, Suzuki T. The effects of multidimensional exercise treatment on community- dwelling elderly Japanese woman with stress, urge, and mixed urinary incontinence: a randomized controlled trail. *International Journal of Nursing Studies* 2011; 48 (10): 1165-72.
12. Lee JH, Yoon HJ, Lee SJ. Modified transobturator tape (canal transobturator tape) surgery for female stress urinary incontinence. *J Urol* 2009;181(6):2616- 21.
13. Sar D, Khorshid L. The effect of pelvic floor muscle training on stress and mixed urinary incontinence and quality of life. *J Wound Ostomy Continence Nurs* 2009; 36 (4): 422- 35.
14. Burgio KL. Behavioral treatment of urinary incontinence, voiding dysfunction, and overactive bladder. *Obstet Gynecol Clin North Am* 2009; 36 (3):475–91.
15. Jahromi M, Talebizadeh M, Mirzaei M. The Effect of Pelvic Muscle Exercises on Urinary Incontinency and Self-Esteem of Elderly Females With Stress Urinary Incontinency. *Global Journal of Health Science* 2014; 7 (2): 71- 9.
16. Hung H, Chih S, Lin H, Tsauo J. Exercise adherence to pelvic floor muscle strengthening is not a significant predictor of symptom reduction for women with urinary incontinence. *Archives of Physical Medicine and Rehabilitation* 2012; 93 (10): 1795-1800.
17. Price N, Dawood R, Jachson S. Pelvic floor exercise for urinary incontinence. *Maturitas* 2010; 67 (4): 309- 15.
18. Burgio K. Behavioral treatment of urinary incontinence, voiding dysfunction, and overactive bladder.

- Obstetrics and Gynecology Clinics of North America 2009; 36 (3): 475- 91.
19. Yoon H, Song H, Ro Y. A comparison of effectiveness of bladder training and pelvic muscle exercise on female urinary incontinence. *International Journal of Nursing Studies* 2003; 40 (1): 45- 50.
 20. Cuthbert S, Rosner A. Conservative chiropractic management of urinary incontinence using applied kinesiology: a retrospective case- series report. *Journal of Chiropractic Medicine* 2012; 11 (1): 49- 57.
 21. Long R, Giri S, Flood H. Current concepts in female stress urinary incontinence. *The Surgeon* 2008; 6 (6): 366- 72.
 22. Lucas M, Bosch R, Burkhard F, et al. EAU guidelines on assessment and nonsurgical management of urinary incontinence. *European Urology* 2012; 62 (6): 1130-42.
 23. Lucas M, Bosch R, Burkhard F, et al. European association of urology guidelines on assessment and nonsurgical management of urinary incontinence. *Actas Urológicas Españolas (English Edition)* 2013; 37 (4): 199- 2013.
 24. Dumoulin C, Hay-smith J. Pelvic floor muscle training versus no treatment, or inactive control treatments, for urinary incontinence in women. *Cochran Database Syst Rev* 2010; 1(1):54- 8.
 25. Aslan E, Komurcu N, Beji Nk, Yalcin O. Bladder training and kegel exercises for women with urinary complaints living in a rest home. *Gerontology* 2008; 54(4):224–31.
 26. Hung H, Hsiao S, Chih S, Lin H, Tsauo J. An alternative intervention for urinary incontinence: retraining diaphragmatic, deep abdominal and pelvic floor muscle coordinated function. *Manual Therapy* 2010; 15 (3): 273- 9.
 27. Burgio K. Behavioral treatment options for urinary incontinence. *Gastroenterology* 2004; 126 (1); 82- 9.
 28. Khan Z, Rizvi J. Non-surgical management of urinary stress incontinence. *Reviews in Gynaecological Practice* 2005; 5 (4): 237- 42.
 29. Khan I, Tariq S. Urinary incontinence: behavioral modification therapy in older adult. *Clinics in Geriatric Medicine* 2004; 20 (3): 499- 509.
 30. Sansoni et al. Tools for Assessing and Monitoring Urinary Incontinence: The Revised Urinary Incontinence Scale (RUIS). Australian Government Department of Health and Ageing, University of Wollongong, Center of health service development; 2011.
 31. Cammu H, Nysten M, Amy J. A 10- year follow-up after Kegel pelvic floor muscle exercises for genuine stress incontinence. *BJU International* 2000; 85 (11): 655- 8.
 32. Tamanini J, Lebrão M, Duarte Y, Santos J, Laurenti R. Analysis of the prevalence of and factors associated with urinary incontinence among elderly people in the Municipality of São Paulo, Brazil: SABE study. *Cad. Saúde Pública* 2009; 25(8):1756- 62.
 33. National Institute for Health and Care Excellence. Urinary incontinence: the management of urinary incontinence in women. NICE clinical guideline 2013; 171 (3): 1- 50.