



Effects of Kegels Exercises and Fitness Exercises in Improving the Stress, Urge or Mixed Urinary Incontinence (U.I.) Among the Elderly Seniors Using an Adult Urinary Diaper Pad Method

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Urinary incontinence (U.I.) is a medical condition in which there an inability to control the urine during rest or even in some strenuous activities. Aging, Overweight, anxiety, and stress were the predisposing factors in developing U.I. 28 healthy male volunteers between the age group of 65-75 were analyzed in this interventional study. A urinary diaper pad was used to assess the leakage during strenuous activities. According to the American college of sports medicine (ACSM) guidelines, the exercises were prescribed and executed. SPSS software version 18 has been used for the analysis of statistics obtained with a confidence interval of 95%. By implementing descriptive statistics Mean and standard deviations (S.D.) were noted. To get the effectiveness of the intervention, paired t-test was done, and a p-value with <0.05 was set as a level of significance for all the tests conducted. Positive changes were observed in the reduction of urinary leakage among

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the participants. The present study reports about finding the effects of Kegels exercise and fitness exercises among the elderly seniors with Urinary Incontinence, designed by the guidelines provided by ACSM health-related fitness components.

Keywords: Urinary incontinence; senior fitness test; adult diaper test; American college of sports medicine.

1. INTRODUCTION

Based on the development, [1] classified the human age 0-12 years as Children, 13-18 years as Adolescent, 19-59 years as Adults, and 60 years and above as Senior Adult. According to the census of the Indian Government in the year 1951 the elderly population was 20 million, and in 1991 it was 57 million, and it has been predicted that there will be a rise in the elderly population by about 324 million by the year 2050 [2]. Described that the mortality rate among the old age population had been reduced by the recent advances in medicine [3], but still, around 86.1% of old age people are suffering from one or more health-related illnesses [4]. Studied the health problems among 407 old age peoples and reported that Hypertension, Diabetes, Ischemic heart diseases, Cataract problems [5], Under-nutrition, and Urinary problems are commonly seen among old age individuals. Inability to control the urine during rest or even in some strenuous activities [6] the prevalence of U.I. among Indian men was 16.4% and 24.52% in women [7]. Leakage of urine is extremely annoying, and generally, it is associated with depression and anxiety [8]. While exertion during coughing or sneezing was termed as Stress urinary incontinence (SUI), the urine may leak during laughing, jumping, or any other day-to-day activities [9]. When the urine leakage is accompanied by urgency, it is termed the combination of both SUI and UUI was termed as mixed urinary incontinence (MUI) [10]. In conducted a cross-sectional study among 7,949 women between the age group of 76.9 ± 5.0 [11] and reported that obesity contributes a major part in U.I. when compared with other risk factors [12]. Reported that 60% to 70% of U.I. is prevalent A senior fitness test (SFT) has to be conducted before engaging the senior adults in physical activity [13]. U.I. increases the stress and fear; it not only decreases the quality of life but also creates an economic burden among common people [14]. Surgical weight loss [15] and dietary weight loss [16] have been showing positive changes in patients with U.I. Most of the people in the community are embarrassed to undergo treatment, and there is a perception that

it is untreatable due to the aging process. The above literature shows that there is a lacuna regarding the therapeutic treatment of urinary incontinence without surgical intervention. Therefore, to address these issues and to fill the lacuna, they aimed to evaluate the Kegels exercise general fitness exercise prescribed based on senior fitness assessment (SFT) in reducing urinary incontinence (U.I.) Fig. 1 shows the work plan flow chart.

2. METHODS

2.1 Participants and Study Design

A group of 28 male participants took part in this interventional study aged between 65 and 75 years for the study duration of 3 months. Participants with cardiovascular diseases, uncontrolled hypertension, any renal, hepatic, respiratory, skin disorders, rheumatologic disease inflammatory conditions, ulcers, open wounds, recent fractures.

2.2 Materials

For this study, we used a pulse oximeter, sphygmomanometer, adult urinary diaper pad, standard height, and weight measuring scale, digital weighing machine for measuring the weight of diapers measurement tape, dumbbells, chair without armrest, and stationery materials.

2.3 Assessment

For enrollment in the study, all participants underwent a physical examination and a screening questionnaire to get the details about their health status (past and present medical history), lifestyle, diet, and the degree of physical activity or exercise. Based on the physical examination and questionnaire result, twenty-eight participants were selected for the subjective assessment. Pad test (P.T.) for assessing urinary incontinence, Senior Fitness Test (SFT), Hamilton Anxiety Rating Scale (HAM-A) were analyzed.

2.4 One Hour Pad Test

The incontinence subject was instructed to wear the pre-weighted urinary diaper and then to wear his regular or comfortable dress over it Fig. 1. Then the subject was advised to drink 500ml of water in < 15 minutes and then rests or sit [17]. Then the subject was instructed to walk for 30minutes, sitting and getting up from the chair (10counts), coughing (10counts), bending and picking up a ball from the floor (5counts) based on the individual exercise tolerance level, the heart rate was monitored continuously using a pulse oximeter during this physical activity [18]. Once the assessment is complete, the subject

removes the urinary diaper and handset over to the examiner, the weight of the pad was measured, and the amount of urine leakage was categorized based on the mild, moderate, and severe U.I.

2.5 Hamilton Anxiety Rating Scale

The scoring was done based on a list of questions that describe certain feelings that people had. One response was selected for each of all the fourteen questions [19]. Based on the score, the individuals were categorized into mild, moderate, and severe anxiety.

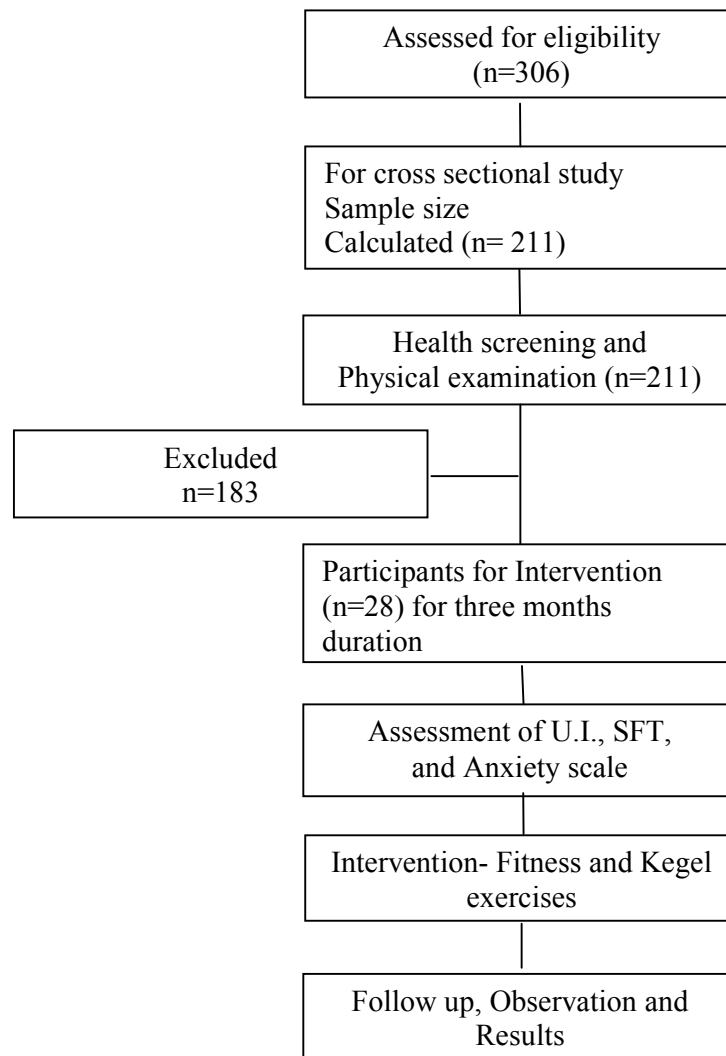


Fig. 1. Work plan flow chart

2.6 Senior Fitness Test (SFT)

The SFT was designed to evaluate the fitness level among senior adult individuals. The SFT consist of a set of tests that can be used to assess the wide range of physical impairment, functional limitation, and reduced disability/ability [20]. All the tests were instructed as well performed properly in a proper posture and position to the examiner's subjects at the beginning of the assessment [21]. The test which had been performed properly was noted.

30-Second Chair Stand: Assessment of the lower extremities' strength was done by sitting and getting from an armless chair for 30sec, and the number of repetitions was noted.

Arm Curl: Assessment of the upper extremities' strength was done by doing the arm curl with a dumbbell weight between (1.5 – 2.5 kgs), and the number of repetitions performed was noted [22].

2-Minute Step Test: Assessment of the cardio-respiratory/aerobic endurance was done by raising the knee (hip and knee forward flexion at the angle of 90o). The number of repetitions performed was noted.

Chair Sit-and-Reach: Assessment of lower extremity flexibility was done by touching the great toe with the middle finger in the extended knee with a seated position in a chair. The distance between the toe and the finger was noted in (cm).

Back Scratch test: Assessment of upper extremity flexibility was done by placing one hand over the same side shoulder with the palm and dragging it down to the back. The other dragged. The distance between the two fingers was noted in (cm).

2.7 Intervention

The Kegels exercise and fitness exercise intervention were prescribed and executed based on the exercise tolerance obtained from the senior fitness test (SFT) and the guidelines provided by the American college of sports medicine (ACSM) for three months. The changes were recorded as shown in Table 1. The heart rate (H.R.) was monitored regularly during the exercises [23]. The intensity of the exercises was increased based on the improvement in the fitness level [24]. Fig. 2 shows an overweight elderly senior with U.I. wearing an adult diaper.

Table 1. Exercise prescription based on the guidelines provided by ACSM for elderly seniors, respectively

Exercise prescribed by(ACSM)guidelines	
Warm-up exercises	Mobilization of all major joints, Low step kicks
Flexibility	Active stretching of all major muscles.(10-min/session)
endurance	Weekly 2 – 3 days, 10-15 min /session METs – 1.1 to 2.9
Core strengthening	Pelvic bridging, 10 – 20 sec, 3 – 4days/week
Strength	3 – 4 sessions/week 2 – 3 sets 6 – 8 reps/set 2 – 4 min rest between sets Tempo – 2:1:4
Kegels exercises	
Instructions: Inhale deeply through the nose, with relaxed pelvic floor muscles, and feel a rise in the abdomen. Exhale slowly and smoothly with gentle contraction of pelvic floor muscles for 3 – 6 sec. Inhale and release the contraction.	10 – 15 times/session, 2 – 3 session/day



Fig. 2. Shows an overweight elderly senior with U.I. wearing an adult diaper

3. RESULTS

SPSS software version 18 has been used to analyze statistics obtained with a confidence interval of 95% set to $p < 0.05$ for all tests [25]. The paired test has been carried out to compare the means and significance of urinary incontinence. Expository statistics were applied to calculate the Mean and Standard Deviations as shown in Table 2. Fig. 3 shows the severity of urinary leakage pre- and post-intervention in grams.

The designed protocol for intervention based on SFT, such as Kegels exercises and fitness exercises, brought about an improvement in

urinary incontinence with a statistically significant $p < 0.05$. The individuals with severe U.I. before intervention were 35.71%, in post-intervention, it was reduced to mild and moderate U.I. 21.42% of the individuals with moderate U.I., among them 14.28% of the severity was reduced to mild U.I. 42.85% of the individuals had mild U.I. before intervention among them 17.85% had developed control over the U.I. post-intervention as shown in Fig. 2. Table 3 shows that 35.71% of the individuals with severe anxiety also suffering from severe U.I., among them, 25.12% of the individual's anxiety was reduced to mild and 10.59% reduced to moderate level with reduced U.I.

Significant reduction in the BMI was also recorded, from 24.63(3.17) Kg/m² was reduced to 23.59(2.65) Kg/m² during pre-and post-intervention, respectively, the participants. Table 4 shows that most individuals with severe U.I. are under the overweight category before the exercise intervention. Individuals with mild U.I. are under the desirable weight category; this shows that there is a moderate correlation $p < 0.692$ between BMI and U.I. reduction in the BMI from overweight to desirable weight category, with severe to moderate U.I., had been observed with significant value $p < 0.417$, this showed that the weight reduction also had positive changes in the U.I. among the participants.

Table 2. Characteristics of subjects

Age Mean(S.D.)	Height Mean(S.D.)	Weight Mean(S.D.)	BMI Mean(S.D.)
71.6(2.1)	171(5.7)	72.14(10.3)	24.63(3.17)

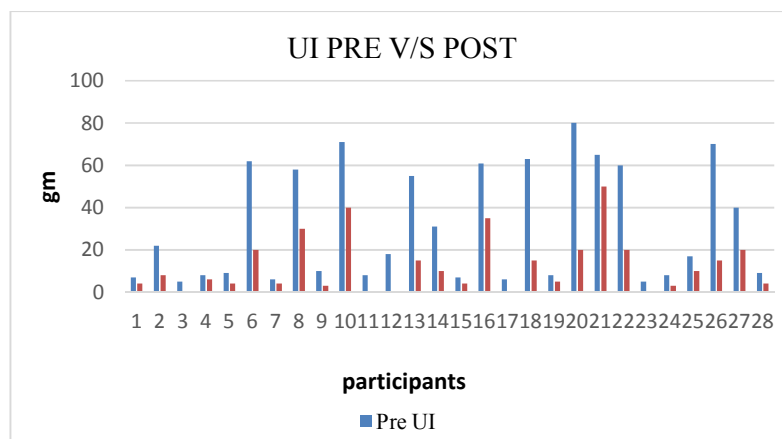


Fig. 3. Severity of urinary leakage pre-and post-intervention in grams (g) among elderly seniors (n=28). Mild (1–10 g), moderate (11-50g), and severe (> 50g)

Table 3. Pre-and post-intervention and interpretation of U.I. and Anxiety Urinary Incontinence (UI), (n=28)

UI (Pre)	Anxiety (Pre)				U.I. (Post)	Anxiety (Post)			
	Mild	Moderate	Severe	Total		Mild	Moderate	Severe	Total
Mild	42.85%	0	0	42.85%	Mild	60.17%	0	0	60.17%
Moderate	3.50%	17.85%	0	21.42%	Moderate	28.57%	10.71%	0	39.28%
Severe	0	0	35.71%	35.71%	Severe	0	0	0	0
Total	46.35%	17.85%	35.71%	100%	Total	89.28%	10.71%	0	100%

Table 4. Pre-and post-intervention and interpretation of U.I. and BMI Body mass index (BMI) n=28)

UI (Pre)	BMI (Pre)			U.I. (Post)	BMI (Post)		
	Desirable weight	Overweight	Total		Desirable weight	Overweight	Total
Mild	39.28%	3.5%	42.85%	Mild	57.14%	3.5%	60.17%
Moderate	17.85%	3.5%	21.42%	Moderate	17.85%	21.42%	39.68%
Severe	10.71%	25%	35.71%	Severe	0	0	0
Total	67.85%	32.14%	100%	Total	75%	25%	100%

Table 5. Evaluation of pre-and post-intervention of SFT Senior fitness test (SFT), (n=28). (*statistically significant) Number of repetitions (reps), centimetre (cm), seconds (sec)

S. no	SFT	(n=28)			
		Mean (S.D.)		t	p-value
		(Pre)	(Post)		
1	Chair stand(reps)	12.07(2.93)	17.71(2.57)	10.12	<0.001*
2	Arm curl(reps)	14.75(3.68)	23.78(5.47)	11.41	<0.001*
3	2-min step(step counts)	65.71(16.91)	85.17(14.08)	11.34	<0.001*
4	Chair sit and reach(cm)	0.17(1.81)	2(1.4)	9.22	<0.001*
5	Back scratch(cm)	-0.19(2.24)	1.55(1.83)	11.15	<0.001*
6	8 feet up & go(sec)	8.76(2.23)	6.33(1.80)	10.12	<0.001*

Senior Fitness Test (SFT) was the major tool that consists of a series of physical tests used to assess the participants' fitness level during the pre-and post-intervention. The administered exercises to the elderly seniors resulted in significant improvement in their fitness level, as shown in Table 5.

4. DISCUSSION

The Kegels exercises and the structured exercise program effectively reduced urinary incontinence (U.I.) among elderly seniors. An increase in physical activity showed a significant improvement in the fitness level and a marked reduction in the anxiety level among 28 senior individuals in the period of 3months.

4.1 UI versus BMI

Physical activities with low intensity below 3.5METs (which are equal to brisk walking of

3hours/week) are safe and effective ways to improve the health condition among elderly adults [25]. In the present study, the exercises were prescribed and executed according to the guidelines provided by the ACSM. The activities were limited between 1.1 – 2.9 METs based on the results of SFT, as shown in Table 1 SFT has been performed to find the fitness level, as it is a very effective tool in assessing the physical impairment, functional limitation, and reduced ability. The weakness of these muscles among obese individual's leads to U.I. It stated that a drastic weight reduction of 45 to 50 kg had been observed after bariatric surgery with significant U.I. When compared our study with the Bump R study, the present study also observed a moderate level of weight loss, with a significant improvement in the U.I. The contrast between our studies Bump R study is that in the present study, exercises were administered only for three months, and positive changes have been observed in the U.I., therefore doing regular exercises and maintaining the desired weight

may reduce surgical interventions among the older people with U.I.

4.2 U.I. versus Anxiety

In studied the effects of stress among the mice and observed that stress causes functional disorder in the bladder, uncontrolled urination frequency, with reduced bladder capacity. In, regular aerobic and strength training results in proper functioning activity, thereby reducing anxiety levels In the present study, well-planned exercises were prescribed and executed safely based on the fitness level obtained from SFT.

In the present study, a non-invasive and cost-effective urinary diaper pad was used to conduct 1hour test for finding the severity of urinary leakage among elderly seniors. Compared to the 24hours diaper test with the one-hour test method, it was very comfortable for older people to handle and reduce the infection by wearing it for a short period. We have classified U.I. only based on the severity into mild, moderate, and severe. No other classification was established; this is the limitation of our study.

5. CONCLUSION

The present study reports findings of the effects of Kegels exercise and fitness exercises among the elderly seniors with Urinary Incontinence, according to the guidelines provided by the ACSM. Cost-effective urinary diapers and focused exercises were given to reduce the severity of the U.I. As well-planned training was designed and executed in a holistic way, including warm-up exercises, stretching to improve flexibility, cardiovascular endurance exercises, core muscle exercises, and strength training based on the assessment results. Exercise not only maintains a healthy body it also controls stress and anxiety levels. Our study has implemented the Kegels exercises focused on controlling the U.I., fitness exercises focused on improving flexibility, muscle power, cardio-respiratory endurance, along with proper breathing techniques in relation to reducing stress and anxiety. The study also suggests that regular physical activities are the best remedy for elderly adults to get rid of health-related and psychological problems.

ETHICAL APPROVAL AND CONSENT

As per international standard or university standard guideline participants consent and

ethical approval has been collected and preserved by the authors.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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