Jagua Publication

Healthcare Issues

3(1) (2024): 50 –63

https://doi.org/10.58614/hi315

Research Article

Relationship Between Body Mass Index And Frequency of Urinary Incontinence: Implication of Kegal and Breathing Exercise

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Abstract:

Background: The Kegel Breathing technique combines breathing and pelvic floor contraction patterns to increase pelvic floor muscular strength while performing daily activities regularly. Normal breathing occurs when the pelvic floor muscles and the breathing muscle (diaphragm) move up and down in harmony manner. ***Aim of the study*****:** The study aimed to evaluate relationship between body mass index and frequency of urinary incontinence (pre & post intervention) for the elderly women. ***Design*****:** A quasi-experimental study design was utilized. ***Sample:*** A purposive sample was selected and this study was performed on 100 Menopausal women diagnosed with stress urinary incontinence. ***Setting:*** gynecological and urological outpatient clinics Beni-Suef university hospital. ***Tools*****:** Data was collected using (I): A structured interviewing questionnaire sheet. (II): The International Consultation on Incontinence Modular Questionnaire ICIQ-SF Scoring system of The ICIQ-UI. (III): Pelvic floor muscles exercises checklist. **Results:** Frequency of urine leakage decreased after implementation of the program only 20% of the studied women reported that their frequency of urination is once a week or less often preprogram; it became 44% post program. At pre-program, 30% of the studied obese women reported two or three times a week. This percentage it decline to 22.2% post program Implementation. ***Conclusion***: A negative correlation between deep breathing and kegel exercises adherence and severity of stress urinary incontinence was found. ***Recommendations:*** Developing awareness program regarding importance and benefits of practicing deep breathing and kegel exercises to reduce stress urinary incontinence symptoms among elderly women.

Key words: body mass index, Kegal and Breathing Exercise, urinary incontinence: Implication

Article History:

Received: May 1, 2024
Accepted: June 20, 2024
Published: June 30, 2024

How to Cite:

Ramadan et al., (2024). "Relationship Between Body Mass Index And Frequency of Urinary Incontinence: Implication of Kegal and Breathing Exercise". *Healthcare Issues 3*(1): 50 – 63. https://doi.org/10.58614/hi315

INTRODUCTION

Stress Urinary incontinence (SUI) considers the most common and distressing health problem among the aging population especially older women, associated with a profound negative impact on their life. Its prevalence estimates 30% to 50% and increases with age among community-dwelling older adults and represents 50% to 60% among nursing home residents. Women are at more risk for SUI three times more than men, because of anatomic, social, and cultural status and also because of the effects of pregnancy, delivery, and menopause (author., 2017; Hassan., 2020; Mohamed et al., 2023a; Sheha et al., 2021; Mohamed et al., 2023b; Ghanim et al., 2024a; Hassan et al., 2024a; Ghanim et al., 2024b).

The Kegel Breathing technique combines breathing and pelvic floor contraction patterns to increase pelvic floor muscular strength while performing daily activities regularly. Normal breathing occurs when the pelvic floor muscles and the breathing muscle (diaphragm) move up and down in harmony manner (Mohamed et al., 2024a; Hassan et al., 2023a; Mohamed et al., 2024b; Hassan et al., 2024b; Hassan et al., 2024c; Hassan et al., 2024d; Mostafa et al., 2024; Hassan et al., 2024e).

Pelvic floor muscle training (PFMT) aims to improve pelvic floor muscle function. The strongest evidence of benefit is for supervised PFMT in women with stress incontinence, with fewer efficacies in those with urgency incontinence. Emerging evidence supports unsupervised delivery of PFMT, which could be cost-effectively delivered through e-training. Women are taught to consciously contract their pelvic floor muscles before and during any increase in abdominal pressure, such as coughing, to avert leakage, and simultaneously to build up the support of the pelvic floor through regular muscle strength training (Omran et al., 2024).

These exercises are often supplemented by bladder retraining advice (systematically increasing voiding interval), techniques to avert urinary urgencyand to avoid imminent stress-induced leakage. In those who are unable to contract the pelvic floor, biofeedback techniques might be useful. Although short-term efficacy is good, with no harmful effects, evidence of long-term benefit is lacking (Ahmed et al., 2024; Ghanim et al., 2024c; Hassan et al., 2023b; Omran et al., 2024b; Aboudonya et al., 2022; Ramadan et al., 2020; Mostafa et al., 2018; Hassan et al., 2020).

Pelvic floor muscle exercises involve squeezing the muscles that would stop the flow of urine. This can be repeated 10-15 times with each squeeze lasting a few seconds. However it is important to note not to do this often during urination as it can be harmful to the bladder-incomplete bladder emptying can increase the risk of urinary tract infection and cause damage to the normal urinary reflexes (Hassan., 2019).

Benefits of kegel exercises include strengthen pubococcygeous muscles , increase blood flow and nerve supply to pelvic region , increase thickness of the vaginal wall and lubrication after menopause , restoration of vaginal muscle tone and improve vaginal health , prevention and treatment of stress urinary incontinence , recover from physical stress after childbirth and improve sexual response and function (Ramadan et al., 2020; Mostafa et al., 2018; Hassan et al., 2020; author., 2019; Saleh et al., 2023; Sheha et al., 2020; Hassan et al., 2023c; Hassan et al., 2023d; Hassan et al., 2021a; Ghanim et al., 2024d; Hassan et al., 2024g; WHO & ICUD., 1998; Mohamed et al., 2023c; Hassan., 2020).

https://doi.org/10.58614/hi315

Aim of the Study

- Assess body mass index for menopausal women who suffering from urinary incontinence
- Evaluate relationship between body mass index and frequency of urinary incontinence (pre & post intervention) for the elderly women

Hypothesis

- Kegal and breathing exercise will improve women's urinary incontinence according to ICIQ-SF scale.
- Urinary incontinence will be affected by women's body mass index and frequency

SUBJECT AND METHODS

Study design

The study followed a quasi-experimental study design.

Study Setting

Beni-Suef University Hospital

Sampling

Sample Type

Purposive sample

Sample Size

Total sample was 100 women who attended to the previous mentioned setting for a period of 9 months from the beginning of July 2021 until the end of March 2022.

Tools of data collection:

Two tools were used for data collection

Tool I: A structured interviewing questionnaire sheet was developed by the researcher in the Arabic language based on a review of recent literatures, under guidance of supervisors. It included personal characteristics data of the study women such as (age, height, weight, body mass index "BMI" education level, occupation, residence, marital status).

Tool II: The International Consultation on Incontinence Modular Questionnaire ICIQ-SF (WHO & ICUD., 1998). The ICIQ is a self-reported survey and screening tool for evaluating the frequency, severity of urinary incontinence. It consisted of 4 main items of 6 total ask for rating of symptoms in the past 4 weeks. Take sum score of items 3, 4, 5 (items 1 and 2 are demographic) for the actual score. The final item is a self-diagnostic item that is un-scored. The ICIQ-UI Short form provides a score ranging from 0-21; with a higher score indicating greater severity of symptoms; this assessment done before and after intervention. MCQ questions from Q1-Q6.

Scoring system of The ICIQ-UI

Total point of scale =38 point (100%)

38*25/100=9.5; So the total score is consider mild when <25% (<10points).

38*50/100=19; So the total score is consider moderate when 25-50 % (10-19 points).

Consider sever when >50% (>19 points).

Tool III: Pelvic floor muscles exercises checklist:

It included check list for exercise technique. This check-list was adapted from (Goda A., et al 2015) (Mohamed et al., 2023d). The adaptation was adding deep breathing technique and

modification in frequency and duration of contraction .It contained 8 items to assess the accuracy of applying the Kegel and deep breathing exercise. This checklist contained step by step of deep breathing and Kegel exercises procedure. MCQ questions from Q1-Q8.

Scoring of pelvic floor muscles exercises checklist

The score zero 0 indicated not done, score 1 indicated done but not accurate, and score 2 indicated done and accurate.

The total score was16 points

Poor practicing for deep breathing and Kegel exercise (women scored less than 4 points),

Fair practicing (score from 4-8 points).

Good practicing (score from 9-12 points).

Excellent practicing (13-16 points).

Supportive material

Instructional brochure developed by the researcher based on review of literatures contained data regarding urinary incontinence, Kegel exercise, and deep breathing exercise.

Validity of the tools

Tools of data collection were investigated for their content validity by three experts in the field of Obstetric and Gynecological Nursing from Faculty of Nursing, Benha University who were selected to test the content validity of the instruments and to judge its clarity, comprehensiveness, relevance, simplicity, and accuracy. All of their comments were taken into consideration; some items were re-phrased to arrive at the final version of the tools. The tools were regarded as valid from the experts point of view.

Reliability of the tools

Reliability of the study tools was applied by the researcher for testing the internal consistency of the tools by administration of the same tool to the same subjects under similar condition, it done by using Cronbach's alpha test, reliability for practice equal 87.2; this indicates high degree of reliability of the study tools.

Pilot study

A pilot study was conducted on 10% (10 women) to evaluate the applicability, clarity of tools.

Preparatory phase

It was included reviewing of local and international related literatures and theoretical knowledge about various aspects of the study problem, and guided the researcher to prepare the required data collection tools.

Field work procedure

The data was collected through a period of nine months, from the beginning of July 2021 until the end of March 2022.

Assessment phase

Firstly the researcher introduced herself to the studied women and explained the aim of the study and explained the benefits of performing Kegel and deep breathing exercises on stress urinary incontinence to encourage them in the participation in the study and maintain their cooperation. All women interviewed individually using the previously mentioned tools.

Implementation phase

The researcher provided the instructions to studied women about Kegel and breathing exercise through three months. At the beginning of the first month; that started immediately after assessment and included two instructional sessions.

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The first instructional session

This session included information about urinary incontinence causes and risk factors, possible ways of management, what are the pelvic floor muscles and their functions, definition of Kegel exercise and its benefits on improving the strength and elasticity of pelvic floor muscles and reducing symptoms of stress urinary incontinence.

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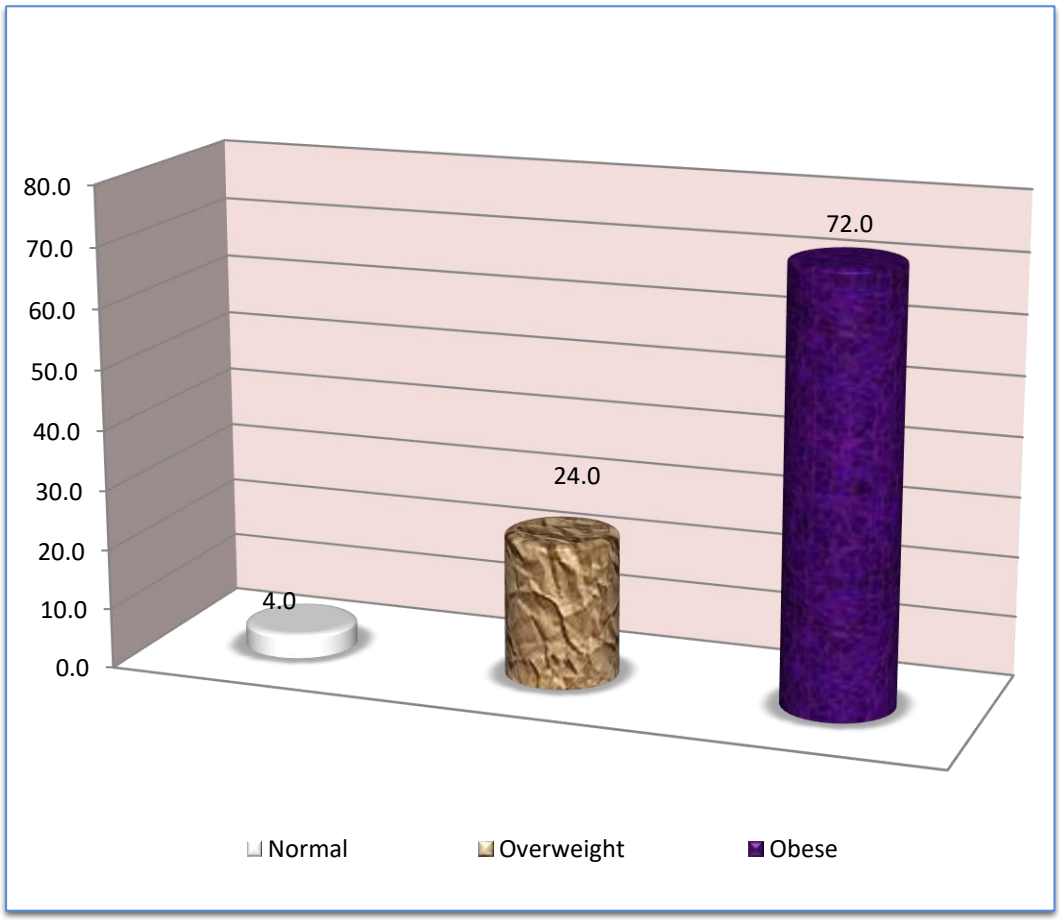
Table 1. Mean and standard deviation of studied sample according to weight, height and Body Mass Index

	Minimum	Maximum	Mean	Std. Deviation
Weight	55.0	120.0	82.680	11.8815
Height	150.0	167.0	160.420	2.8610
BMI	21.76	45.17	32.1224	4.47973

Figure 1. Distribution of studied sample according to their obesity level (n=100)



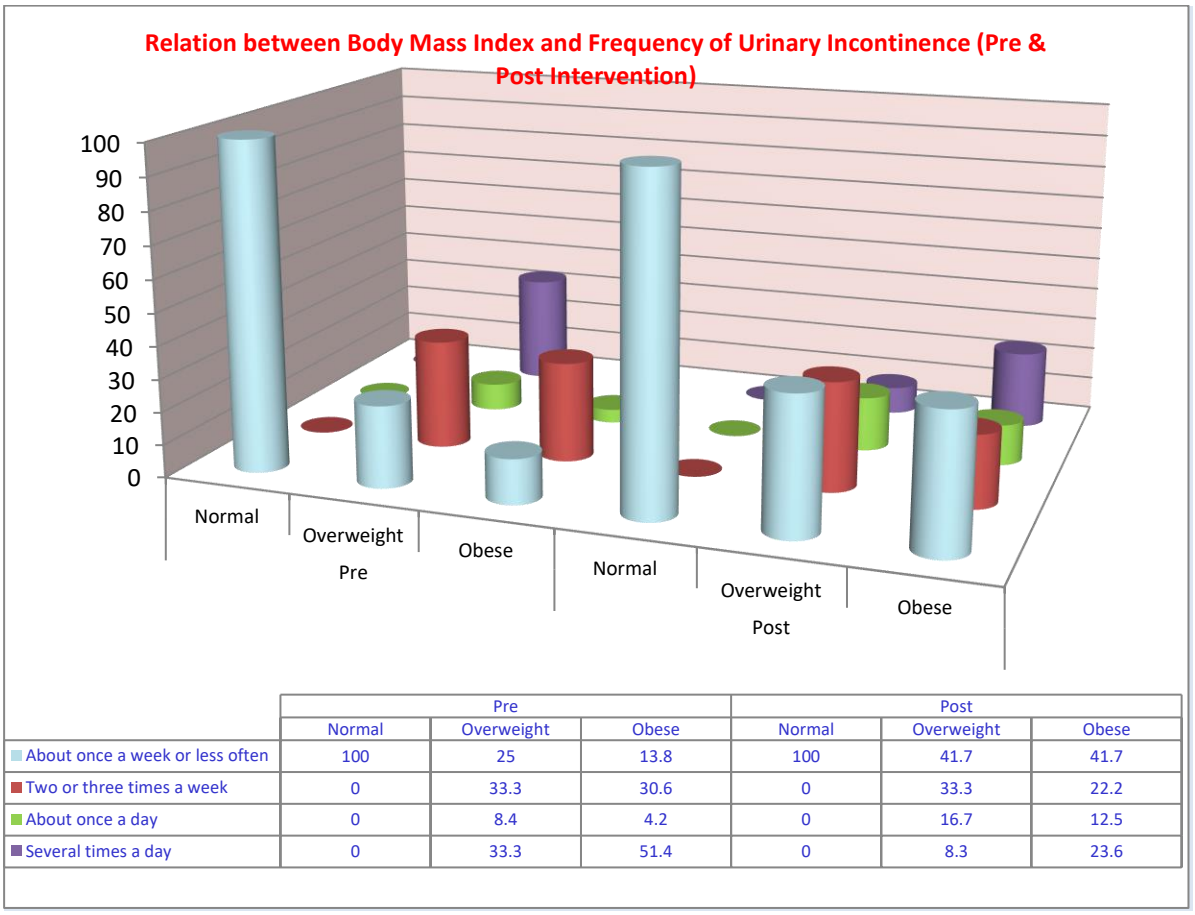
https://doi.org/10.58614/hi315

Table 2. Distribution of studied sample according to their ICIQ-SF scale (n=100)

ICIQ-SF scale	Pre		Post		X^2	p-value
	No	%	No	%		
Frequency of urine leakage						
About once a week or less often	20	20.0	44	44.0	23.785	0.000**
Two or three times a week	30	30.0	24	24.0		
About once a day	5	5.0	13	13.0		
Several times a day	45	45.0	19	19.0		
The amount of urine leakage						
A small amount (under wear or pad is damp)	61	61.0	83	83.0	13.318	0.004*
A moderate amount (under wear or pad is wet)	32	32.0	12	12.0		
A large amount (under wear or pad is very wet	7	7.0	5	5.0		
***Time of urine leakage**						
Leaks before getting to the toilet	24	24.0	23	23.0	4.382	0.357
Leaks during cough or sneeze	100	100.0	100	100.0		
Leaks during sleeping	2	2.0	1	1.0		

**results not mutually exclusive*

Figure 2. Relation between body mass index and frequency of urinary incontinence (pre and post intervention)



	Pre			Post		
	Normal	Overweight	Obese	Normal	Overweight	Obese
About once a week or less often	100	25	13.8	100	41.7	41.7
Two or three times a week	0	33.3	30.6	0	33.3	22.2
About once a day	0	8.4	4.2	0	16.7	12.5
Several times a day	0	33.3	51.4	0	8.3	23.6

Table 3. Correlation between deep breathing and kegel exercises adherence and severity of incontinence through the intervention phases

Deep breathing and kegel exercise adherence	Post intervention Severity of incontinence	
	r	p-value
1st week of the 1st month	-0.369	0.000**
At the end of the 1st month	-0.709	0.000**
At the end of the 2nd month	-0.478	0.000**
At the end of the 3rd month	-0.556	0.000**

*Pe rson correlation coefficient test *significant at p≤ 0.05 **highly significant at p≤0.01*

DISCUSSION

The results of the current study displays studied women ICIQ-SF scale (pre & post practice of deep breathing and Kegel exercise). It reveals that frequency of urine leakage decreased after implementation of the program. Finding of the constant study showed that twelve weeks of Kegel and deep breathing exercise elucidate statistically significant improvement of stress urinary incontinence symptoms. This result supported with (Chitra, J 2019) who assessed the role of postpartum Kegel exercises in the prevention and cure of stress incontinence and found that it takes near fifteen weeks of regular exercise for result to be noticeable. Other attributing factors may exist among present study women including; age, menopause, number of pregnancies which may delay the positive effect of Kegel. From the researcher point of view "regularly" is the key word as performance of Kegel infrequently or improbably is not enough to reveal advances (Omran et al., 2024c).

Regarding correlation between Body Mass Index and the frequency of urinary incontinence, the current study demonstrated that there was statistical difference in the frequency of urinary incontinence in relation to Body Mass Index among the studied women after practicing deep breathing and kegel exercises. This was agreed with (Jayachandran 2019) who assessed the Prevalence of Stress, Urge, and Mixed Urinary Incontinence in Women and mentioned that body mass index has been associated with urinary incontinence as the greatest number of women in the overweight and obese categories had stress urinary incontinence (Hassan et al., 2024h).

The current study revealed that regular practicing of deep breathing and kegel exercise improved urinary incontinence symptoms. This was in line with at least five studies. First, (Dumoulin et al., 2018) who conducted a review about "Pelvic floor muscle training versus no treatment, or inactive control treatments, for urinary incontinence in women"; they concluded that PFMT can cure or improve symptoms of SUI and all other types of UI. It may reduce the number of leakage episodes, the quantity of leakage. They also suggested that PFMT could be included in first -line conservative management programs for women with UI (Mohamed et al., 2024d).

Second, (Sankarganesh,A et al 2018) who assessed Interferential Therapy versus Pelvic Floor Exercise for the Management of Stress Urinary Incontinence in Women and concluded that pelvic floor exercise therapy significantly improves the pelvic floor muscle function in subjects with urinary incontinence in women (Hassan et al., 2021b). *Third*, (Gadhavi,T 2019)who studied the effect of tanzberger exercise versus kegel exercise on pelvic floor muscle strength in postmenopausal women with stress incontinence an experimental study and reported that tanzberger exercise and kegel's exercise both were effective with improving pelvic floor muscle strength and reducing score of revised urinary incontinence scale in women with stress incontinence, but none intervention is better than other (Hassan et al., 2024i).

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Fourth, (Lee et al 2021) who studied "the effects of pelvic floor muscle exercise on urinary incontinence in elderly women with cognitive impairment"; they found that a significant reduction in the number of UI and micturition episodes was observed in the study group and a significant improvement in the subjective symptoms evaluated by the ICIQ-SF was noted after 12 weeks of PFME (Mohamed et al., 2024e). *Fifth*, (Nie et al 2017) who done a meta-analysis about pelvic floor muscle training for the treatment of urinary incontinence. They concluded that regular PFMT relieved UI symptoms, strengthened PFM, and improved the quality of life of women with UI in this meta-analysis (Hassan et al., 2023e). Finally (Vyas R et al 2018) who studied the Effects of pelvic floor muscle training vs an assisted pelvic floor muscle training among rural perimenopausal women with urinary incontinence and documented that Kegel's exercise treats urinary incontinence symptoms by reinforcing weakened pelvic floor muscle and improving elasticity. It also improves the tone and function of the pelvic floor muscles (Mohamed et al., 2024f).

From the researcher point of view this result suggests a possible positive effect of Kegel's exercise on treating the urinary incontinence among menopausal women. This result may be attributed to the fact that urethral closure is maintained by an adequate support provided by the endopelvic fascia and the tonic contraction of the levator ani muscles. When properly carried out, Kegel's exercise restores the ability to contract these muscles in a timed and coordinated way and thus improves or restores continence. A negative correlation between deep breathing and kegel exercises adherence and severity of stress urinary incontinence was found. This attributed to the effectiveness of program. The results of the current study declare the women's condition getting better after the implementation of the educational program regarding kegal and breathing exercise. The results indicated that there is a significant enhancement in women's condition. Moreover, the progression of good women's and regression of frequency of micturition, after the implementation of the guidelines compared to before, were observed associated with statistical differences. This improvement/progression was also maintained up to the follow-up test through the observed results. This improvement could be attributed to that all women of the sample were committed with the guidelines. Additionally, the attending of the guidelines sessions and the lecture and positive reinforcement or the long-term retention of knowledge, as well as wide verities of used educational used methods (Hassan., 2019; Masters., 2013a; Hassan., 2017; Gamel et al., 2020).

The distributed Arabic booklets, also, played a crucial role in attaining and retain knowledge about kegal and breathing exercise. Booklets are best used when they are brief, written in plain language, full of good pictures and when they are used to back-up other forms of education. This is, in accordance, with Edgar Dale's or the NTL's Pyramid of Learning as cited by Masters as the pyramid illustrated that individuals can retain 10.0% of what he read and 20.0% of what he sees and hear (audiovisual). The same author added that ones can retain 50.0% of what he learned by a discussion (Hassan & Nasr., 2017; Nady et al., 2017; Masters., 2013b).

CONCLUSION

A negative correlation between deep breathing and kegel exercises adherence and severity of stress urinary incontinence was found.

Recommendations

Developing awareness program regarding importance and benefits of practicing deep breathing and kegel exercises to reduce stress urinary incontinence symptoms among elderly women.

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https://doi.org/10.58614/hi315