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EFFECT OF CORE EXERCISES ON BED WETTING IN POST-MENOPAUSAL WOMEN

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Abstract

Background: Nocturnal enuresis (NE) had the worst impact on the standard of lifetime of postmenopausal women.

The aim: This study aimed to identify and investigate the impact of core strengthening exercises on postmenopausal nocturnal enuresis.

Methods: Sixty women with postmenopausal nocturnal enuresis participated in this study. They were aged from 50 to 65 years. They were randomized into 2 equal groups. Group (A) included 30 women who recruited only in pelvic floor exercises program 3 times /week for 12 weeks. Group (B) included 30 women who participated in pelvic floor and core strengthening exercises program 3 times /week for 12 weeks. The pelvic floor muscles strength was measured utilizing a perineometer. frequency volume chart (FVC) was used to measure fluid intake, urine output, voiding and leakage frequencies. International Consultation on Incontinence Questionnaire–Short Form (ICIQ-SF) was utilized to assess quality of life of the women.

The results: The results showed a significant improvement in pelvic floor muscles strength in both groups with significant difference among the two groups (p=0.04). According to FVC, there was a significant decrease in voiding and leakage frequencies in both groups with significant difference between the two groups (p=0.03 and 0.02 respectively). Fluid intake and urine output had no significant differences in both groups. The ICIQ-SF also showed significant improvement in both groups, but also there was a statistically significant difference among them (p=0.04).

Conclusion: Core strengthening exercises were effective for improving pelvic floor muscles strength and quality of life in postmenopausal nocturnal enuresis.

Key Words: Nocturnal enuresis, core strengthening exercises, pelvic floor muscles, quality of life.

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INTRODUCTION

Menopause is described as the perpetual termination of the human ovaries' principal functions: the process of ova ripening and release, as well as the release of hormones that promote both the development and uterine lining loss. Menopause occurs in the majority of cases in their forties or fifties, and it symbolizes the end of a phase of their lives **(Tariq, 2019)**.

One of the evolutionary stages is menopause that every woman goes through as she matures, and it exposes them to significant changes. Reduced estrogen levels cause a wide range of symptoms that can influence women's physical, mental, and sexual health, as well as their employment, social activities, mood, communication with others, life pleasure, and, ultimately, their standard of living **(Jafari et al., 2017).**

Around 70% of women approaching menopause have menopausal symptoms. Menopausal symptoms include menstrual irregularities, in which periods become more frequent, shorter or longer, and lighter or heavier, as well as a sudden feeling of heat or heat that spreads throughout the body, causing redness, particularly in the face and upper body, mood swings, insomnia, and vaginal dryness, in which the vagina loses its usual moisture **(Abdi et al., 2016).**

Nearly half of all women post menopause experience urinary incontinence (UI), making it a significant social problem **(Deshmukh, 2019).** The risk of illness is twice in postmenopausal women. This is frequently due to a decrease in estrogen levels, that causes urogenital atrophy most frequently, which includes vaginal and urinary tract atrophy. The urethra and bladder are affected by a lack of estrogen, limiting their ability to manage urine functions. Reduced estrogen also changes the pH of the vulva and vagina, making them more prone to bacteria, yeast, and other organisms **(Cagnacci et al., 2020).**

Nocturnal enuresis (NE) is characterized by uncontrollable urination throughout the night. The medical term for nighttime urinary incontinence. Although NE can be a bothersome condition, it is quite common **(Tsuji, 2021).** It's possible that NE is a common type of enuresis in youngsters. In adults, however, it could indicate an underlying illness or disease. About 2% of adults suffer with NE, which can be caused by a variety of factors and should be treated **(Tekin, 2016).**

Adult-onset of NE has been linked to a variety of medical issues including urological disorders, but little study has been performed on the occurrence and risk factors for NE in adults **(Wein, 2017).**

Physiotherapy has been shown to be efficient in the management of UI in numerous studies. According to statistics, physiotherapy techniques give beneficial results in around 80% of patients suffering from stage I UI and mixed form, as well as 50% of patients with stage II UI. Pelvic floor physiotherapy was recommended as a treatment in older women, as well as during pregnancy and childbirth, by the Interdisciplinary Polish Society Guidelines. It is now thought that pelvic floor muscle stimulation as well as active muscle training could represent the most effective form of therapy. Furthermore, it is recommended that all patients participate in pelvic floor exercises, which can help strengthen their weak muscles **(Gücük, 2017).**

The transversus abdominus, diaphragm, multifidus, and pelvic floor muscles are among the muscles that make up the "core." Maximum stability in the lower back and abdominal region, yet coordinated movement of the legs, arms, and spine when these muscles work together. Because the majority of people aren't aware of how to successfully co-contract these muscles when completing rehabilitation activities, it's critical to be taught how to do so **(Nesser and Fleming, 2016).**

During dynamic movement, the core primarily stabilizes the thorax and pelvis, as well as providing internal pressure to evacuate toxins (vomit, feces, urine, etc.).

Incontinence can be caused by weak core muscles **(Mashi et al., 2020).**

I-Subjects:

The study was a randomized controlled study to examine the impact of core strengthening exercises on postmenopausal NE. Sixty postmenopausal women complaining from NE participated in this study. The patients were recruited from the Physical Therapy Department in Al-Azhar university hospital in Cairo in the period from August 2019 to August 2021.

Inclusion criteria:

1- Their ages ranged through 50-65 year with at least 5 years post menopause.

2- Their body mass index (BMI) didn't exceed 30 Kg/m2.

3- They have nocturnal enuresis at a minimum of 2 times weekly.

4- They are well educated.

Exclusion criteria:

1. History of pelvic disorders as pelvic inflammatory disease and pelvic organ prolapse.
2. Any previous pelvic operations as vaginal vault prolapse surgery, cystocele surgery, rectocele surgery.
3. Any previous abdominal operations as appendectomy, bariatric surgeries, colonoscopy, hysterectomy.
4. Smokers and alcohol abuse.
5. Diabetes mellitus.
6. Urinary tract infection.
7. Neurological disorders as multiple sclerosis, stroke and spinal lesion.
8. Chronic constipation.
9. Chronic cough.
10. Stress incontinence, Urge incontinence.

Design of the study:

Pre-test post-test control group design.

The women were randomized into 2 equal groups (A&B).

- **Group A:** (Control group) which included 30 women who received only pelvic floor exercises, three sessions per week for 12 weeks.
- **Group B:** (Study group) which included 30 women who received pelvic floor and core strengthening exercises, three sessions per week for 12 weeks.

Ethical consideration:

The whole procedure was explained for each patient. Prior to the start of the study, patients signed an informed consent form. This research was given approval by the Faculty of Physical Therapy at Cairo University.

II-Materials:

1. Recording data sheet:

Data was collected from all women who participated in this study and recorded in data sheet (Appendix II).

2. Standard weight and height scale:

It was utilized to determine weight as well as height for all women who participated in the study.

3. Pelvic floor perineometer:

Before and after the study, a hand-held clinical peritron perineometer, (German A3 model), was used to assess the strength of the PFMs by employing vaginal probes to evaluate vaginal closure pressure. The air pressure in the sensor is transferred through the connecting tube and shown on the reading unit when the pelvic floor contracts. The peritron perineometer looks to be a very accurate way to measure pelvic floor muscle strength. **(Rahmani and Mohseni-Bandpei, 2011)**

Measurement of PFMs strength using the peritron perineometer was a reliable and valid method in women with UI **(Chen et al., 2016).**

1. **Condoms:** It was used to cover the vaginal probes prior to application to prevent ascending infections.
2. **KY gel:** It was employed over the vaginal probes for lubrication.
3. **Cotton and disinfected solution:** They were used to clean both vaginal probes and vulva as well as the perineum of the women.
4. **Pillows, cushions as well as sheets:** The women's bodies were supported using cushions and pillows for maximum relaxation. The women were covered with sheets.

4. Frequency volume chart (FVC):

This chart to record fluid intake and urine output before and after the study. This

allowed keeping track of how much water was consumed, how much urine was excreted, and how often the bladder was emptied on a daily basis. Frequency volume charts are a non-invasive, low-cost, and simple-to-use tool. They're helpful for assessing, diagnosing, and monitoring therapies in women who had urine incontinence of different types **(Hofmeester et al., 2016).**

The frequency volume chart (FVC) is a simple graph that shows information such as the number of voids, consumption of fluids, frequency, overall output, as well as the number of times incontinence occurs per day. The time span that the patient is expected to fill up the chart varies by FVC; previously, it was seven days, but currently it is 3 days. The 3 day chart is widely utilized, and it has been proven that it is as beneficial as the larger 7 day chart. Patients who have been properly counseled can readily and accurately fill out these charts **(Epstein et al., 2017).**

5. International Consultation on Incontinence Questionnaire–Short Form (ICIQ-SF):

It was utilized to evaluate bed wetting, urine leakage frequency, severity, as well as the impact on quality of life (QOL) **(Abdelwahab et al., 2015).** The ICIQ-SF is a short yet powerful questionnaire that can be utilized in clinical and epidemiological studies as well as ordinary clinical practice. The Arabic version of the ICIQ-SF is a reliable and easy-to-use questionnaire for assessing UI in clinical practise and research among Arabic women. The questionnaire is divided into five sections, each of which collects information on demographics, urination frequency, urine leakage, and the impact of UI on QoL **(Al-Shaikh et al., 2013)**.

III-Procedures:

A) Evaluative procedures:

1-Weight and height measurements:

To calculate the BMI, The woman's weight and height were assessed while she was dressed in a thin layer of clothing prior to joining in the study then calculating BMI based on the following equation:

BMI (Kg/m^2) = weight(kg)/height^2 (m^2).

2- Pelvic floor muscles strength:

Pelvic floor muscles strength was assessed for all women by Peritron perineometer before and after the study.

Step (1):

Preparation of the women:

1- All women were informed to evacuate their bladders to be relaxed before evaluation session.

2- the women were taught how to use the probe to control their neutral muscles (muscles involved in hand grip) and were instructed to contract, relax, and watch the screen for feedback at each stage.

Step (2):

Relaxation techniques:

Before recording any data, the patient was asked to relax to avoid apprehension and fear as well as to evaluate the level of woman awareness through the following techniques:

1 - Mental relaxation: patients were asked to count from 10 to 0 for 5 sets while keeping their eyes and mouth slightly closed.

2 - Physical relaxation: using breathing exercises:

A- Diaphragmatic breathing, the patient was instructed to inhale slowly through nose (keeping shoulders relaxed) while feeling the air flow in and lift abdomen upward. Then, with a sigh, slowly let the breath out from the mouth, feeling the tension went with it. A period of rest equal to the interval of deep breathing was given after three repetitions to avoid hyperventilation (**Chen et al., 2016).**

B - Costal breathing, The patient was instructed to inhale deeply through the nose, open the ribs, and exhale through the mouth with a sigh. A period of rest equal to the period of breathing was given after three times repetition of deep breathing to avoid hyperventilation **(Korkie et al., 2015)**.

Step (3)

Evaluative step:

- Peritron perineometer: The patient was in comfortable Crock lying position, having a pillow supporting their head and smaller cushions positioned under their hips and lower back.
- Increasing pelvic floor muscle control as follow:
  - The woman was instructed to train her pelvic floor muscles so that she could contract and relax them as needed. The instructions for the 10-minute exercise were to "contract sufficiently to control the bowel action as well as the urethral orifice action," "concentrate in this activity," "hold," then "relax." to increase pelvic floor muscle awareness.
  - After cleaning, condoming, and lubricating the Peritron perineometer vaginal probe using KY gel, it was gently inserted into the vagina to assess vaginal closure pressure as well as the strength of the internal pelvic floor muscles.
  - The internal probe enhanced proprioception and helped muscle awareness.
  - Peritron perineometer display was described to the patient "a relaxed muscle lights up less number, and contracting muscle lights up more" Attempt to relax the muscle as far as you can. The numbers she saw at the top of the screen reveals pelvic floor muscle activity.
  - Each woman was instructed to contract her pelvic floor muscle as much as she could around the electrode, count to ten, and then relax. Three times this procedure was performed. The data from all three measurements were summed up, and that mean was recorded. Both at the beginning and the end of the study, this step was carried out **(Abe-Takahashi et al., 2020)**.

3- Frequency volume chart:

1. Fluid intake and urine output were measured for all women by frequency volume chart at the beginning and at the end of the study.
2. For a minimum of 3 days, each day, record how much she drinks (intake) and how much urine she passes (output).
3. Recorded separate times for voids, leaks and fluid intake.
4. A plastic jug with a millilitre (ml) capacity was used.

4- International Consultation on Incontinence Questionnaire–Short Form (ICIQ-SF):

1. Subjective frequency, severity, as well as quality of life (QOL) were all measured by three components. The responses to the questions were tallied for a minimum of 0 and a maximum of 21**(Slavin et al., 2019).**
2. Following Klovning's severity categorization for the ICIQ-UI-SF in four severity categories: slight ICIQ-UI-SF score (1-5), moderate (ICIQ-UI-SF score 6-12), severe (ICIQ-UISF score 13-18) and very severe (ICIQ-UI-SF score 19-21) **(Slavin et al., 2019).**

B) <u>Treatment procedure:</u>

1- Pelvic floor exercises:

1. These were performed by all women in both groups (A and B).
2. Women were instructed to empty their bladders prior to to the exercises in order to reduce stress.
3. Each woman was given a soft pillow to rest her head on as well as small cushions for supporting up her lower back and hips in a crock lying position.
4. Each woman gained relaxation physically and mentally.
5. The command was "to contract as she controls the bowel action and urethral orifice action, concentrate in this action hold for 3 to 5 seconds then relax for 3 to 5 seconds and repeat for 30 repetitions, 3 times /week for 12 weeks".

2- Core strengthening Exercises:

1. These were performed by women in group (B) only.
2. Core strengthening exercises included exercises for the transverse abdominis, multifidus, internal obliques, external obliques, rectus abdominis and diaphragm 3 times /week for 12 weeks.
3. For training the transverse abdominis and multifidus, quadribed exercise was performed and maintained for 30 seconds for 10 repetitions.

The starting position for exercise was quadribed position on all four limbs. Then, the woman was asked to:
a) place her hands under her shoulders and her knees under her hips.
b) engage the abdominal muscles to keep spine in a neutral position.
c) Curl her shoulder blades inwards.
d) raise her right arm and left leg off the floor, maintaining the shoulders and hips parallel.
e) glance down at the floor, lengthen the back of her neck and drop the chin into the chest.
f) hold for a few seconds in this position, then return to the initial position.
g) Raise her left arm and right leg to shoulder height and hold for a few seconds.
i) Return to the starting position **(Walton et al., 2019)**.
4.for training internal and external obliques muscles, side crunches were performed for 10 repetitions for each side:
a) the woman lies on her back with her knees flexed and feet flat, arms are down by her sides with palms facing up or down.
b) the woman inhale and use her core to lift her head and upper back off the ground.
c) the woman tries to reach down to her left side tapping her heel with her left hand keeping her head and upper back off the ground.
d) return to the initial position.
e) repeat on the other side.
5. for training rectus abdominis muscle, abdominal crunches were performed for 10 repetitions of 3 sets, the woman was requested to:
a) lie on her back with knees flexed and feet flat, hands supporting back of the head.
b) lift her head and upper back while contracting her abdominal muscles and hold for 5 seconds.
c) return to the starting position **(Wawryszewicz et al., 2020)**
6. Abdominal inspiratory exercises were performed for 10 repetitions to strengthen the diaphragm. The patient was in crock-lying position and he was instructed to breathe in deeply through her nose (with shoulders relaxed), feeling the air flow in while lifting her abdomen. Then, sigh slowly to release the air from your lungs **(Gopaladhas et al., 2014).**

DATA ANALYSIS:
The statistical analysis of the data was done using the mean as well as the standard deviation (SD). The results of the same group pre and post occlusion were compared using a paired (t) test. The results of the two groups were compared using an unpaired t-test. The p-value is less than 0.05.

RESULTS
As shown in **Table (1)**, the results revealed a significant improvement in pelvic floor muscles strength in both groups with significant difference among the two groups (p=0.04). According to FVC, there was a significant decline in voiding and leakage frequencies in both groups with significant difference among the two groups (p=0.03 and 0.02 respectively). Fluid intake and urine output had no significant differences in both groups. Also, there was a significant enhancement in ICIQ-SF in both groups with significant difference among the two groups (p=0.04).

Table (1): Comparison between all measured variables in both groups:

Variable		Pre test	Post test	p-value	significance
Perineometry (cmH2O)	**A**	38.49± 9.08	44.15±11.9	0.008*	HS
	B	36.66± 9	46.91±15.3	0.002*	HS
	p- value	0.91	0.04*		**Significant**
Fluid intake (ml)	**A**	1924.6± 465.1	1953.3±401.3	0.81	NS
	B	1821.1± 509.8	1924.8±470.2	0.19	NS
	p- value	0.34	0.5		**Significant**
Urine output (ml)	**A**	1532± 304.9	1522.6±294.5	0.29	NS
	B	1477.6± 272.7	1482±209.3	0.91	NS
	p- value	0.32	0.12		NS
Frequency of voids (time/day)	**A**	10.56± 2.3	9.08±2.4	0.01*	Significant
	B	11.03± 2.5	7.29±4.3	0.001*	HS
	p- value	0.75	0.03*		**Significant**
Leakage frequency (time/week)	**A**	3.86± 1.7	1.56±1.5	0.001*	HS
	B	3.13± 2.1	0.7±0.87	0.001*	HS
	p- value	0.17	0.02*		**Significant**
ICIQ-SF	**A**	9.13± 3.2	7.33±2.8	0.01*	Significant
	B	8.56± 3.42	6.23±5.1	0.004*	HS
	p- value	0.64	0.04*		**Significant**

DISCUSSION

The current study was carried-out to evaluate the impact of core strengthening exercises on postmenopausal nocturnal enuresis. Sixty postmenopausal women complained from nocturnal enuresis participated in this study. They were recruited from the physical therapy department in Kasr Al-Ainy university hospital in Cairo from August 2019 to August 2021. The patients were randomly assigned into two equal groups. All the patients were evaluated before and after the study by using perineometer, frequency volume chart (FVC) and International Consultation on Incontinence Questionnaire–Short Form (ICIQ-SF).

Menopausal women may be affected by nocturnal enuresis, a complex and dangerous illness. It's not just a serious medical condition; it's also an obvious psychosocial problem that lowers a woman's self-esteem and negatively impacts her daily life **(Gandhi et al., 2016).** Exercise and other forms of physical activity, along with early diagnosis and appropriate pharmaceutical and non-pharmacological therapy for NE, play an important role in enhancing the quality of life of menopausal women along with decreasing the severity of their symptoms **(Friedman, 2013).**

In the current study the patients aged from 50 to 65 years, Patients with BMI more than 30 Kg/m^2 were excluded from this study. Postmenopausal women can protect their quality of life and reduce the risk of developing UI and female sexual dysfunction by making favorable lifestyle decisions, including maintaining a healthy weight, as early as the perimenopausal years **(Pace et al., 2009).**

In the current study, perineometer was utilized to assess the strength of the pelvic floor muscles, frequency volume chart (FVC) was used to measure fluid intake, urine output, voiding and leakage frequencies and ICIQ-SF was utilized to

assess the effect of urinary leakage on quality of life.

According to the findings of the current study, the strength of the pelvic floor muscles increased significantly in both groups (p=0.008 and 0.002, respectively), along with a significant difference among the groups (p=0.04). The ICIQ-SF also showed significant improvement in both groups, however there was a statistically significant difference among them (p=0.04). FVC showed that the frequency of voiding and leakage decreased significantly in both groups, with a statistically significant difference among them (p=0.03 and p=0.02, respectively). Fluid intake and urine output had no significant differences in both groups .

In group (A), the improvement may be attributed to Pelvic floor muscle training, It promotes the structural support of the pelvis by moving the levator plate to a higher location inside the pelvis and increasing hypertrophy as well as stiffness of its connective tissue (**Borello et al., 2006; Thompson and O'Sullivan, 2003).** These effects could possibly be due to increased muscle mass stabilizing the urethra **(Thüroff et al., 2011).** Furthermore, by doing a small number of isometric repetitions at maximum effort, it improves the muscular components of the urethral supports **(Neumann et al., 2006)**

Kegel's exercise improves suppleness and strengthens a weakening pelvic floor muscle, which helps with incontinence problems. The tone as well as performance of the pelvic floor muscles are also improved **(Purba, 2021).** This outcome could possibly be explained by the fact that the endopelvic fascia provides appropriate support for urethral closure, as well as the tonic contraction of the levator ani muscles. When performed correctly, Kegel exercises improve or restore the ability to contract these muscles in a very timed as well as coordinated manner, hence facilitating or restoring urinary continence **(Friedman, 2013).**

Abd El-Aty and Hassan, (2021) investigated the results of Kegel's exercise on severity of enuresis as well as quality of life in menopausal women. For 12 weeks, forty postmenopausal women with enuresis did Kegel's exercise three times a week for 20 minutes (100 contractions). According to the findings, Kegel's exercise strengthens pelvic floor muscles, reduces the severity of UI, and greatly enhance the QOL of menopausal women with UI.

Dumoulin et al. (2018) did a review compared Pelvic floor muscle training with no therapy or inactive control treatments, and their findings were consistent with those of the present study. They came to the conclusion that PFMT can cure or enhance all types of UI. It has the potential to reduce the amount of leakage events and leaking. They also proposed including PFMT in first-line conservative treatment strategies for women with UI.

In another controlled study, **Lee et al. (2017)** explored the impacts of pelvic floor muscle strengthening on incontinency in older women having cognitive impairment. After 12 weeks of PFMT, they discovered a significant decrease in the rate of UI and micturation events in the study group, as well as the symptoms improved significantly as evaluated by the ICIQ-SF.

And in a study comparing pelvic floor muscle exercise (PFME) to no treatment for UI in women, **Dumoulin et al. (2014)** found that UI improved in the PFME group following 3 months. Additionally, this group used fewer protectors, urinated less frequently, and produced less urine overall than the control group.

The results of the present study are in line with those of **Park and Kang (2014)**, who found that Kegel exercises are more beneficial than no treatment for the treatment of women with stress UI. Furthermore, this finding is consistent with the findings of **Nygaard et al. (2013),** who found that PFM instruction improved PFM strength and reduced the incidence as well as severity of incontinence. In addition, a review by **Pereira et al. (2012)** found that

training the pelvic floor muscles, either on its own or in conjunction with multimodal exercises, appeared to be a beneficial strategy in reducing urinary symptoms in old aged women with UI.

The current study's results were at contradiction with those of **Wang and Ying (2009),** who examined whether or not pelvic floor muscle training changed muscular tone in that area. Using the vaginal digital test as well as a provocative test, they found no statistically significant difference in PFM strength before PFMT was used to treat UI. The discrepancy between results of this study and results of Wang and Ying study could also be due to limited number of patients participated in their study that was limited to 10 patients only and for one month only.

In group (B), the improvement could also be attributed to the combined effect of both pelvic floor and core strengthening exercises. The development of intra-abdominal pressure as well as the transfer of trunk load throughout normal actions requires the activation of deep trunk-stabilizing muscles, that in turn improves healthy body function (Sapsford, 2004). Prior studies have recommended that The capacity of the pelvic floor muscles to contract is also aided by engaging the trunk-stabilizing muscles **(Bø et al., 2009 ; Sapsford, 2004).**

As a result, trunk stabilization exercises may be an effective way to improve the efficiency of pelvic floor muscle exercises. The treatment effect could also be the result of synchronizing the diaphragm, PFM, transversus abdominis, as well as the obliquus internus abdominis to reinforce an effective forceful expiratory pattern, that was the primary cause of UI. Successful forced expiration without leaking requires a good diaphragm breathing pattern, as described by **Sapsford, (2004).** While prior methods targeted individual muscles, this one focuses on how those muscles work together to support the body's natural stress-control mechanisms **(Morin et al., 2004; Mørkved et al., 2003).**

Pelvic floor muscles activity is synchronized with the core muscles of the trunk, transversus abdominis, multifidus and diaphragm **(Sapsford, 2004 ; Hodges et al., 2007)** The latter constitute the abdominal cylinder, and the coordinated and balanced activation of those four muscles helps to maintain continence by counteracting high intra-abdominal pressure (IAP**) (Vleeming et al., 2012).**

Also, When the PFMs and transversus abdominis are contracted to a submaximal contraction, the most effective sort of bladder neck elevation occurs. As a result, there is sufficient counteracting force against an increase in IAP, which aids in the effective closure of the urethra **(Sapsford et al., 2013).**

Kim et al., (2011) analysed the efficacy of supervised as well as unsupervised pelvic floor muscle exercises utilising trunk stability for treating UI. After eight weeks of pelvic floor muscle training using trunk stability exercises, the Bristol Female Lower Urinary Tract Symptom (BFLUTS) questionnaire and a perineometery were measured, revealing significant enhancements in BFLUTS and hence the maximal vaginal squeeze pressure. As a result, the study found that using trunk stabilization to exercise the pelvic floor muscles is also efficient for the management of incontinence symptoms which came in line with this study.

Consistent with the results of a randomized controlled trial on the efficacy of diaphragmatic, deep abdominal, as well as pelvic floor muscle exercises for the treatment of enuresis in women performed by **Hung et al., (2010).** Following a four-month intervention period, the twenty-minute pad test, three-day voiding diary, maximal vaginal squeeze pressure, holding time, as well as QOL were all enhanced ($p = 0.001$). The cure/improvement rate was greater than 90%. Within the training group, both the amount of leakage as well as the number of leaks were significantly reduced. As a result, Hung et al. came to the conclusion that diaphragmatic, deep

abdominal, as well as PFM retraining could lead to significant improvements in symptoms as well as QOL. It will be an alternative method of treating UI in females.

Sakipour and Mojtahedi, (2019) examined the impact of 4 weeks of spinal stabilization exercises on enuresis of the aging women. Based on the ICIQ-OAB questionnaire, spinal stabilization exercises led to a statistically significant decrease in incontinence in aging women (p=0.001), as measured by a decrease in urinary frequency during the day (p=0.083), during sleep (p=0.001), and leakage of urine (p=0.002).

Another study was conducted by **Walton et al., (2019)** to analyze the results of eight weeks of pelvic core stability program on health outcomes of 35 women. Pelvic and transverse abdominus contractions, as well as a gradual pelvic floor and core strengthening training regimen. At 8 weeks, the results were measured by completing surveys on pain, incontinence, and quality of life. Pelvic floor dysfunction, urinary, and colorectal anal discomfort symptoms were shown to be significantly reduced in the study.

CONCLUSION

According to the results of this study, core strengthening exercises combined with Kegel exercises were effective for improving pelvic floor muscles strength as well as quality of life in postmenopausal nocturnal enuresis and should be added to the care of such patients.

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