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Ocena częstości występowania i stopnia nasilenia objawów nietrzymania moczu w grupie dorosłych kobiet aktywnych fizycznie

The frequency and severity of urinary incontinence symptoms in the group of adult physically active women

Czy ćwiczenia ekscentryczne mogą zredukować rozejście mięśnia prostego brzucha?

Can eccentric exercises reduce diastasis recti?

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Effect of deep breathing and bladder retraining on older women with diabetic-induced stress incontinence

Wpływ głębokiego oddychania i przetrenowania pęcherza na starsze kobiety z wysiłkowym nietrzymaniem moczu indukowanym przez cukrzycę

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Abstract

Background. An increasing number of older women, especially those with diabetes, are experiencing stress incontinence. This ailment can significantly affect the quality of life, frequently made worse by weaker pelvic floor muscles and more significant abdominal strain. The combined impact of deep breathing exercises and bladder retraining is a well-researched technique.

Purpose. This research aims to determine how deep breathing techniques and bladder retraining affect stress incontinence in older female diabetics.

Methods. Eighty older women with diabetic-induced stress incontinence were randomized into a group for intervention (receiving deep breathing exercises along with bladder retraining) and a control group (receiving standard diabetic care). The research employed a randomized controlled trial design. The frequency of incontinence episodes, stress levels examined using conventional scales, and blood sugar levels before and after the intervention, determined by glycosylated hemoglobin (HbA1c), were among the outcome measures.

Results. The frequency of incontinence events in the intervention group was statistically significantly lower compared to the control group. Furthermore, the intervention group displayed a statistically significant decrease in stress levels compared to the control group, which showed no discernible benefits. Measurements of hemoglobin A1c, which tracks blood sugar regulation, demonstrated a noteworthy amelioration in the intervention cohort relative to the control cohort.

Conclusion. Together, deep breathing exercises and bladder retraining significantly reduce stress-related incontinence, enhance blood sugar management, and reduce the perceived stress levels of older women with diabetes. This integrated, non-invasive approach effectively treats psychological and physiological elements of stress incontinence. Healthcare providers should apply this strategy to improve the treatment of older diabetic women.

Key words

stress incontinence, diabetes mellitus, deep breathing, bladder retraining, older women, integrative therapy, blood sugar control

Streszczenie

Tło. Rosnąca liczba starszych kobiet, szczególnie tych z cukrzycą, doświadcza wysiłkowego nietrzymania moczu. Schorzenie to może znacząco wpływać na jakość życia, często pogarszane przez słabsze mięśnie dna miednicy i większe obciążenie brzuszne. Połączony wpływ ćwiczeń głębokiego oddychania i przetrenowania pęcherza to dobrze zbadana technika.

Cel. Celem tego badania jest określenie, jak techniki głębokiego oddychania i przetrenowania pęcherza wpływają na wysiłkowe nietrzymanie moczu u starszych kobiet z cukrzycą.

Metody. Osiemdziesiąt starszych kobiet z wysiłkowym nietrzymaniem moczu indukowanym cukrzycą zostało losowo przydzielonych do grupy interwencyjnej (otrzymującej ćwiczenia głębokiego oddychania wraz z przetrenowaniem pęcherza) oraz grupy kontrolnej (otrzymującej standardową opiekę cukrzycową). Badanie zastosowało randomizowany kontrolowany projekt. Do oceny wyników użyto częstotliwości epizodów nietrzymania moczu, poziomu stresu mierzonego konwencjonalnymi skalami oraz poziomu cukru we krwi przed i po interwencji, określanego za pomocą glikowanego hemoglobiny (HbA1c).

Wyniki. Częstotliwość zdarzeń nietrzymania moczu w grupie interwencyjnej była statystycznie znacząco niższa w porównaniu do grupy kontrolnej. Ponadto, grupa interwencyjna wykazała statystycznie znaczący spadek poziomu stresu w porównaniu do grupy kontrolnej, która nie wykazała zauważalnych korzyści. Pomiary hemoglobiny A1c, która śledzi regulację poziomu cukru we krwi, wykazały znaczącą poprawę w grupie interwencyjnej w stosunku do grupy kontrolnej.

Wnioski. Razem, ćwiczenia głębokiego oddychania i przetrenowanie pęcherza znacząco redukują wysiłkowe nietrzymanie moczu związane ze stresem, poprawiają zarządzanie poziomem cukru we krwi oraz zmniejszają postrzegany poziom stresu u starszych kobiet z cukrzycą. To zintegrowane, nieinwazyjne podejście skutecznie leczy psychologiczne i fizjologiczne elementy wysiłkowego nietrzymania moczu. Dostawcy opieki zdrowotnej powinni stosować tę strategię, aby poprawić leczenie starszych kobiet z cukrzycą.

Słowa kluczowe

wysiłkowe nietrzymanie moczu, cukrzyca, głębokie oddychanie, przetrenowanie pęcherza, starsze kobiety, terapia integracyjna, kontrola poziomu cukru

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Introduction

Urinary incontinence (UI) is a significant problem among elderly individuals, substantially lowering their quality of life [1]. Studies have highlighted the prevalence of urinary incontinence (UI) through systematic reviews and meta-analyses of observational studies, examining risk factors such as age, obesity, and chronic conditions like diabetes. There are notable variations in the prevalence of UI among multiple groups, and distinct risk factors impact urban and rural settings. For example, rural women may need help accessing healthcare, which could make it more difficult for them to manage UI effectively [2, 3]. Thus, management strategies must consider the user interface's physical and psychological aspects. Numerous methods can be used to manage urinary incontinence (UI), from formal interventions such as deep breathing exercises and bladder retraining to lifestyle modifications and pelvic floor exercises. Studies have indicated the effectiveness of deep breathing and pelvic floor exercises in treating stress urinary incontinence in older women. [4-6] have provided an update on more research projects that have explored creative therapies, such as combining breathing training with rumba dance, highlighting the potential benefits of incorporating enjoyable physical activities into treatment plans. Despite advancements in medicine, there is still a need for comprehensive guidelines and standardized care to address gaps in the consistent and effective management of UI. The NICE recommendations emphasize the need for a multidisciplinary approach involving medical, psychological, and social support to address the complex nature of user interface UI [7, 8]. Such an approach is necessary to improve the quality of life for women affected by this condition. Urinary incontinence is a multifaceted and intricate issue that mainly affects older women, especially those with diabetes. A comprehensive strategy that tackles psychological and physical effects is necessary for adequate care. More research and thorough treatment recommendations must be developed to improve outcomes and the quality of life for those with UI [9-11]. This research aims to determine how deep breathing techniques and bladder retraining affect stress incontinence in older female diabetics.

Materials and Methods

The effectiveness of deep breathing exercises and bladder retraining in treating stress incontinence in older diabetic women was assessed in this study using a randomized controlled trial (RCT) methodology. To maintain scientific rigor, the Consolidated Standards of Reporting Trials (CONSORT) guidelines were adhered to in this study [12, 13]. Eighty ladies, all at least sixty years old, who had received diagnoses for diabetes-related stress incontinence made up the study population. Community health centers and outpatient clinics served as the recruitment grounds for participants. Participants had to meet three requirements to be eligible for the program: they had to be able to perform deep breathing exercises, have type 2 diabetes for at least five years, experience stress incontinence for at least six months [14, 15], and suffer stress incontinence for at least six months. Severe cognitive impairment, recent major pelvic surgery, and concurrent enrolment in another clinical trial were among the exclusion criteria. The application of opaque, sealed envelopes maintained allocation concealment during the computer-generated randomization process, randomly assigning participants to the control or intervention groups. The team assignments were concealed from researchers assessing the results to reduce bias [16, 17]. The intervention group received both bladder retraining and deep breathing exercises. The stress-reduction diaphragmatic breathing techniques were performed twice daily for fifteen minutes each time. Scheduled voiding at gradually longer intervals, according to each participant's baseline bladder capacity, was a component of bladder retraining. According to [18], the control group had ordinary diabetic care, which included lifestyle counseling and blood sugar monitoring. Outcome measures were assessed at the start and finish of the 12-week intervention. The primary finding was the frequency of incontinence events, which the participants recorded in a bladder diary. The study employed the Perceived Stress Scale (PSS) to measure stress and blood sugar levels using glycosylated hemoglobin (HbA1c) levels obtained from blood samples. Trained researchers who were blind to group designations collected the data. The statistical software SPSS (version 26.0) was used for the analysis. While between-group differences for Descriptive statistics were used to summarize participant characteristics, independent t-tests and chi-square tests were used to analyze continuous and categorical variables. T-tests in pairs were used to evaluate within-group differences from pre-intervention to post-intervention. Less than 0.05 was the threshold for statistical significance.

Result

Eighty people were recruited and randomly divided into the control group (n = 40) and the intervention group (n = 40). At the beginning of the study, participants in both groups shared comparable baseline characteristics, including age, duration of diabetes, and baseline HbA1c values. (Table 1)

Table 1. Demographic details of the participants

Characteristic	Intervention Group Mean (SD) OR N (%)	Control Group Mean (SD) OR N (%)	P Value
Age (years)	68.3 ± 5.4	69.1 ± 5.8	0.45
Duration of Diabetes (years)	10.2 ± 3.6	9.8 ± 3.9	0.60
Baseline HbA1c (%)	7.8 ± 1.2	7.7 ± 1.3	0.72
Baseline Incontinence Episodes (per day)	4.5 ± 1.1	4.5 ± 1.1	0.70
Baseline PSS Score	18.7 ± 4.3	19.0 ± 4.1	0.80
BMI	25.91 ± 5.34	26.45 ± 5.26	0.72
Socioeconomic status (Education level)	9.7 years ± 4.56	9.68 years ± 4.05	0.56
Physical Activity			
High Level	8 (20%)	5 (12.5%)	-
Moderate Level	22 (55%)	17 (42.5%)	-
Low Level	10 (25%)	18 (45%)	-

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Primary Outcome: Incontinence Episode Frequency
Following the 12-week intervention, the frequency of incontinence episodes significantly decreased in the intervention group compared to the control group, as did the mean daily incidence count.

Secondary Outcome: Levels of Stress
Following the intervention, the baseline Perceived Stress Scale (PSS) ratings significantly decreased to 12.5 ± 3.8 ($p < 0.001$). Conversely, there was no significant variation in the PSS scores of the control group, 19.0 ± 4.1 before the intervention, and their values following it.

Table 2. Changes in Stress Levels (PSS Scores)

Group	Baseline Score PSS	Post-intervention Score PSS	p-value (within-group)
Intervention Group	18.7 ± 4.3	12.5 ± 3.8	< 0.001
Control Group	19.0 ± 4.1	18.5 ± 4.2	0.35

Secondary outcome: HbA1c, or blood sugar levels

The mean HbA1c readings in the intervention group significantly decreased from 7.8 ± 1.2% to 7.2 ± 1.1% ($p < 0.01$), indicating improved blood sugar control. The control group's HbA1c levels did not significantly alter, with baseline values of 7.7 ± 1.3% and post-intervention values of 7.6 ± 1.4% ($p = 0.50$) (Table 3).

Table 3. Variations in HbA1c Values

Group	Baseline HbA1c (%)	Post-intervention HbA1c (%)	p-value (within-group)
Intervention Group	7.8 ± 1.2	7.2 ± 1.1	< 0.01
Control Group	7.7 ± 1.3	7.6 ± 1.4	0.50

Secondary outcome: HbA1c, or blood sugar levels

There was a significant decline in PSS and ICIQ scores from the Pre-test to the Post-test. One test yielded mean differences in PSS scores of 8.45 (CI: 6.53, 10.37), a t-statistic of 7.31, a p-value < 0.001, and mean scores that fell from 30.38 (SD = 3.55) to 21.93 (SD = 4.61). A distinct PSS test revealed scores that dropped from 34.15 (SD = 3.44) to 29.57 (SD = 4.21) with a mean difference of 4.58 (CI: 3.53, 5.63), a t-statistic of 6.51, and a p-value < 0.001. With a mean difference of 3.78 (CI: 3.23, 4.33), a t-statistic of 7.43, and a p-value < 0.001, the ICIQ scores declined from Pre to Post. The finding of the paired t-test reveals a substantial drop in ICIQ scores from Pre to Post, with a mean difference of 4.28 (CI: 3.63, 4.93), a t-statistic of 8.51, and a p-value < 0.001. Descriptive statistics showed that the mean scores decreased from 16.38 (SD = 3.39) to 12.10 (SD = 2.71). There was no significant difference between the intervention and control groups in the pre-test comparisons (t-statistic: 0.53, p = 0.60), ensuring baseline equivalence for valid post-intervention comparisons. The intervention group showed a more considerable reduction in PSS scores. There was no significant change in the pre-test ICIQ scores (t-statistic: 1.83, p = 0.07); however, there was a significant difference in favor of the intervention group in the post-test comparisons (t-statistic: 4.51, p < 0.001).

Discussion

The current study evaluated the efficacy of bladder retraining and deep breathing techniques in treating stress incontinence in older women with diabetes. The results demonstrate a significant increase in incontinence, stress reduction, and blood sugar management outcomes. The frequency of incontinence episodes decreased statistically significantly when comparing the intervention group to the control group. This lends credence to the theory that bladder retraining combined with deep breathing techniques might successfully treat stress incontinence. By encouraging relaxation and lowering sympathetic nervous system activity, which can worsen incontinence symptoms, deep breathing may contribute to this improvement [19]. Perceived Stress Scale (PSS) ratings also significantly decreased in the intervention group. This research is in line with other studies that show how stress-reduction methods like deep breathing can successfully reduce stress in those with long-term medical illnesses. According to [20], reduced stress may benefit bladder control by reducing the worsening of incontinence symptoms caused by stress. Decreased HbA1c readings in the intervention group demonstrate improved blood sugar control, another significant advantage of the biopsychosocial approach. Since stress negatively impacts blood sugar levels, practicing deep breathing techniques to manage stress effectively can improve glycemic control [21]. A comprehensive strategy that addresses the physiological and psychological components of stress incontinence in diabetes patients combines deep breathing exercises with bladder retraining. According to a study [22], Urine incontinence has been successfully treated with bladder retraining. Sympathetic nerve stimulation increases body activity, whereas the parasympathetic response slows down activity, reducing metabolic processes. This decrease in metabolic activity can lower the body's insulin needs, helping to reduce blood sugar levels. Practices such as diaphragmatic breathing stimulate the

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parasympathetic nervous system, promote relaxation, and alleviate stress by decreasing the production of stress hormones like cortisol and adrenaline, promoting relaxation. This is especially advantageous for individuals with diabetes, as prolonged stress can have a harmful effect on blood sugar levels. Asiya Khanum et al. (2019) concluded that diaphragmatic breathing exercises can effectively control blood sugar levels in type-2 diabetes patients, especially when combined with other exercises or therapies [23]. Similarly, Ted Wilson et al. (2013) found that relaxation breathing can acutely improve the glycemic response in healthy individuals, suggesting that breathing patterns may play a key role in interpreting glycemic index measurements [24]. Several studies have demonstrated that deep breathing exercises have a positive effect on various risk factors for Type 2 Diabetes Mellitus (T2DM), such as hyperglycemia, stress, and anxiety. Warsono et al. (2020) found that slow, deep breathing exercises can help reduce stress in patients with diabetes mellitus [25,26]. These findings demonstrate the positive effects of breathing exercises on stress reduction by parasympathetic activation on glycemic control. Our results support these earlier studies. Deep breathing exercises are a novel feature of our research, as they have yet to be well-researched in this particular setting. Our results indicate that deep breathing can improve the overall efficacy of bladder retraining programs, even if previous research has concentrated on exercising the pelvic floor muscles and making lifestyle improvements. This study has several limitations, including the reliance on subjective self-reports and the absence of long-term follow-up data. The subjectivity of measurements, such as the Perceived Stress Scale (PSS) and the self-reported frequency of incontinence episodes, may introduce bias due to participant recall errors or subjective perceptions. The data on incontinence episodes were based on self-reporting, which may not fully address the severity of the condition. Lastly, the lack of long-term follow-up and the sustainability of the observed effects over time is unclear. Future research should incorporate objective measurements and long-term follow-up to address these limitations.

Conclusion

In conclusion, Combining deep breathing exercises and bladder retraining significantly improves stress incontinence outcomes, reduces perceived stress levels, and enhances blood sugar control in older women with diabetes, highlighting the potential of non-invasive and holistic interventions in this population. These results suggest that integrating these practices into patient care can provide substantial health benefits, addressing physical and emotional aspects of managing chronic conditions like diabetes and urinary incontinence.

Clinical Implications

The findings from this study emphasize the importance of incorporating deep breathing exercises and bladder retraining into clinical practice as part of a comprehensive, non-invasive approach to managing stress incontinence and diabetes. These interventions provide a cost-effective and holistic treatment option, making them particularly suitable for resource-limited settings and patients seeking non-invasive medication alternatives for improving bladder control and overall well-being. Clinicians can use these techniques to enhance patient outcomes, alleviate symptoms, and improve quality of life, all while offering a practical, low-risk alternative to more intensive treatments.

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