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THE SYSTEMATIC REVIEW OF STRESS URINARY INCONTINENCE

[*]Rizkia Amal Ramadhani
[*]*Banyumanik General Hospital, Semarang, Indonesia*

Corresponding Author:
ramadhani613@gmail.com

ABSTRACT

Introduction*: Stress urinary incontinence (SUI) affects around 400,000 women in Switzerland, constituting 60% of cases, with symptoms impacting daily life for over 77.5% of affected individuals, especially those over 40 and in nursing homes. The condition, often triggered by activities like laughing or coughing, ranges from minor leaks to more substantial urine loss, significantly affecting quality of life due to weakened pelvic muscles and other factors like menopause and obesity. Treatment options, from pelvic exercises to surgical procedures, require individualized care and a collaborative healthcare approach. This review aims to explore these advancements, focusing on recent studies in SUI management.*

Methods*: The researchers in this study followed the 2020 Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines to ensure that their work met the required standards. This was done to ensure the precision and reliability of the conclusions derived from the research.*

Result*: Our search produced 14 results. After looking at the titles and summaries, we discovered 12 papers that fit our criteria after excluding several articles because they did not fit into criteria. But after reading the full papers carefully, we included five papers in our final analysis. These papers included a retrospective observational study and several case reports.*

Conclusion*: Stress urinary incontinence (SUI) affects around 400,000 women in Switzerland, constituting 60% of cases, with symptoms impacting daily life for over 77.5% of affected individuals, especially those over 40 and in nursing homes. The condition, often triggered by activities like laughing or coughing, ranges from minor leaks to more substantial urine loss, significantly affecting quality of life due to weakened pelvic muscles and other factors like menopause and obesity. Treatment options, from pelvic exercises to surgical procedures, require individualized care and a collaborative healthcare approach. This review aims to explore these advancements, focusing on recent studies in SUI management.*

Keyword: *stress urinary incontinence, urogynaecologic*

INTRODUCTION

Introducing stress urinary incontinence (SUI), an involuntary urinary leakage triggered by increased intra-abdominal pressure, is pivotal in understanding its widespread impact, particularly among women in Switzerland, where an estimated 400,000 individuals are affected. SUI, constituting 60% of all cases, significantly affects five to twenty percent of women and intensifies with age. Understanding the prevalence and impact, SUI accounts for approximately 15.7% of adult women affected, with the symptoms reported as bothersome by over 77.5% and moderate to severe by 28.8%. Moreover, advancing age and menopause increase the likelihood of SUI, with studies indicating a 41% prevalence in women over 40 years old and affecting up to 77% of elderly females in nursing homes.[1,2]

Primarily characterized by urine loss during physical activities such as laughing, sneezing, or coughing, SUI causes bothersome symptoms impacting patients' daily lives. The condition may manifest as minor leakage or substantial streams of urine, disrupting their quality of life. Various etiologies contribute to SUI, including pelvic floor muscle and connective tissue weakening, attributed to factors like pregnancy, menopause, obesity, chronic cough, or past pelvic surgeries. Diagnosing SUI involves a comprehensive evaluation encompassing detailed history, physical examination, voiding diary, urinalysis, and measurement of postvoid residual urine volume. While urodynamic testing might not be initially indicated, it proves necessary in complicated cases or failed treatments. [1,2]

Treatment options, ranging from behavioral modifications to pharmacological and surgical interventions, aim to improve symptoms and enhance quality of life. These treatments include pelvic muscle exercises, bladder retraining, biofeedback, or surgical procedures like TVT (tension-free vaginal tape) insertion, colposuspension, or urethral bulking injections. Despite diverse treatment avenues, SUI management remains individualized, necessitating an interprofessional healthcare approach involving urogynecologists, urologists, nurses, and gynecologists. Enhanced patient education and support groups play a crucial role in empowering patients to make informed decisions and manage their condition effectively.[3]

The impairment of the urethral closure mechanism during physical strain leads to leakage, ranging from minor drops to significant streams of urine, based on the severity of stress urinary incontinence. Studies corroborating the integral theory proposed by Ulmsten and Petros identify six anatomical structures likely involved in the decrease of urethral closure pressure, highlighting factors such as postmenopausal estrogen deficiency, weakened pelvic floor muscle and connective tissues due to various factors like pregnancy, childbirth, obesity, and chronic conditions like cough or constipation.[4]

The development of the sub-urethral sling insertion technique, rooted in the integral theory, revolutionized incontinence surgery in the mid-1990s. This technique, utilizing a tension-free support of the mid-urethra with synthetic polypropylene tape (TVT), has become the gold standard for treating stress urinary incontinence. Conversely, the more invasive colposuspension technique, once the primary approach, is now infrequently used alone but in combination with prolapse surgeries. Treatment options for stress urinary incontinence encompass diverse approaches, from intra- or paraurethral injections of bulking agents to the use of vaginal pessaries. Surgical procedures for incontinence and prolapse are typically performed consecutively, with the prolapse surgery preceding the tape insertion in most cases. These advancements in therapeutic approaches, including TVT surgery and alternative techniques, have significantly impacted the management of stress urinary incontinence, offering varied and effective options to enhance women's quality of life.[3,4] This systematic review seeks to explore and highlight these innovative advancements, presenting a comprehensive overview of recent studies in this evolving field.

METHODS

Protocol

The researchers in this study followed the 2020 Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines to ensure that their work met the required standards. This was done to ensure the precision and reliability of the conclusions derived from the research.

Criteria for Eligibility

For inclusion in the study, published articles had to meet particular requirements. They had to be research papers written in English, focusing on stress urinary incontinence. The studies had to meet the following criteria: they needed to have been published after 2018 but within the applicable timeframe for this systematic review. Articles falling into categories like editorials, lacking a DOI, review articles that were already published, or duplicating previously published journal papers were excluded from the assessment.

Search Strategy

We conducted a comprehensive literature search using PubMed, focusing on studies published from 2018 to 2023. The search terms employed were as follows"urinary incontinence, stress"[MeSH Terms] OR ("urinary"[All Fields] AND "incontinence"[All Fields] AND "stress"[All Fields]) OR "stress urinary incontinence"[All Fields] OR ("stress"[All Fields] AND "urinary"[All Fields] AND "incontinence"[All Fields]). Moreover, we performed cross-referencing of relevant articles to reveal additional research. The evaluation of study quality, methodology, interventions, and results was undertaken independently by the researchers, resolving any differences through discussion and agreement.

Furthermore, both researchers collected and compared discoveries from all studies, considering the potential for conducting a meta-analysis if deemed feasible.

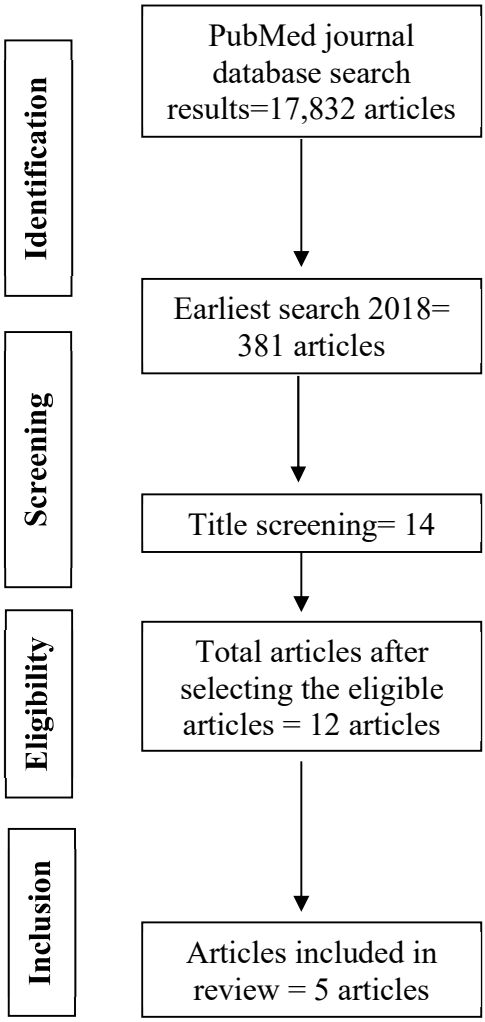

Figure 1. Article search flowchart

Inclusion and exclusion criteria

Inclusion criteria for the studies were as follows: (1) original research that assesses stress urinary incontinence; (2) Randomized Controlled Trials (RCTs) or observational studies (cohort or case-control studies); (3) availability of relevant data. Exclusion criteria were as follows: (1) ongoing studies or studies without available data; (2) duplicate publications. In cases of duplicate publications, the most recent article was chosen; (3) Non-English language studies were excluded.

Data Retrieval

The authors conducted a thorough examination of relevant studies, specifically selecting those that met precise inclusion criteria. They focused on original, unpublished papers in English to ensure a refined and high-quality selection. The analysis covered essential information, such as study particulars, authors, publication dates, locations, and research methodologies, aligning with the study's objectives.

Author	Origin	Method	Sample Size	Result
Wang, X., Xu, X., Luo, J., Chen, Z., & Feng, S. (2020).[6]	China	Randomized control trial.	A total of 108 eligible primiparas were enrolled from January to April 2018.	Participants showed significant improvement in symptom severity across the study, which was most significant at 6 weeks postpartum (β= −4.245, p < 0.001). No significant difference was found in symptom severity between groups (β= −0.344, p = 0.168). The interaction effect between interven- tion and time on adherence was significant. Compared with the control group, greater self-efficacy was shown in the audio group at 6 weeks (β=

				4.425, p = 0.009), 3 months (β= 3.204, p < 0.001) and 6 months (β= 4.457, p < 0.001) postpartum. Participants in the audio group indicated less bladder neck descent (16.5 vs. 19.5, p = 0.020) at 6 weeks postpartum, better pelvic floor muscle strength (12.5% vs. 34.0%, p = 0.012; 4.2% vs. 18.0%, p = 0.030) and sexual function (22.2 vs. 17.3, p = 0.007) at 6 months postpartum.
Vigil et al., 2021.[7]	Canada	Analytical study.	74,968 women underwent stress urinary incontinence surgery.	Of the women 74,968 underwent stress urinary incontinence surgery during the study period. There were 5,505,576 women in the control group. Over a median followup of 8.5 years (IQR, 5.5e11.9), 587 pelvic malignancies occurred in the surgery group. Women who underwent stress incontinence surgery had a reduced risk of pelvic malignancy independent of surgery type, compared to controls (Wald type 3 p <0.001; mesh HR, 0.68 [95% CI, 0.62e0.76]; p <0.0001; nonmesh HR, 0.37 [95% CI, 0.29e0.46]; p <0.0001). The individual pelvic cancers similarly demonstrated a reduced risk of malignancy following stress incontinence surgery.
Karjalainen, P. K., Gillor, M., & Dietz, H. P. (2020).[8]	US.	Retrospective, cross-sectional study.	878 consecutive women assessed at a tertiary urogynaecologic clinic between July 2016 and November 2018.	Of 424 women, 362 (85%) had overt, and 62 (15%) occult SUI. There were 136 (32%) women who had a significant cystocele on imaging; 57 (42%) were classified as type II and 79 (58%) as type III. On multivariable regression, age and cystocele type were significantly associated with occult SUI. Odds for occult SUI was 10.9 times higher with type III (cystocele with an intact retrovesical angle) than with type II cystocele (cystocele with an open retrovesical angle; 95% CI 1.3–90.9). Conclusions: Cystocele type affects the risk of occult SUI. Type III cystocele (intact retrovesical angle) associates with occult SUI.
Weber-Rajek,.et al (2020).[9]	Poland	Randomized control trial.	128 women with stress urinary incontinence.	In both experimental groups, a statistically significant decline in depressive symptoms (BDI-II) and an improvement in urinary incontinence severity (RUIS) and quality of life (KHQ) were found in the following domains: “social limitations,” “emotions,” “severity measures,” and “symptom severity scale.” Moreover, self-efficacy beliefs (GSES) improved in the experimental group that received ExMI (EG2). No statistically significant differences were found between all measured variables in the control group. Comparative analysis of the three study groups showed statistically significant differences at the final assessment in the quality of life in the following domains: “physical limitations,” “social limitations,” “personal relationships,” and “emotions.”
Chmielewska D, et al. (2019).[10]	Poland	Experimental study	18 women (mean age 52.9; SD 4) were subject to analysis.	During five trials conducted in two positions, the sEMG activity of the pelvic floor muscles was assessed. However, there was no noticeable enhancement in the bioelectrical activity of these muscles during contraction post sEMG biofeedback training or Pilates exercises. Notably, following eight weeks of sEMG biofeedback training, a decline in the resting bioelectrical activity of pelvic floor muscles was observed during relaxation after sustained contraction, albeit solely while in a supine position. Conversely, no such impact was detected in the Pilates exercise group. In the BF (sEMG biofeedback) group, there was a substantial decrease of 68.5% in the number of incontinence episodes after the treatment concluded (timepoints: 1 vs. 2), and an even more considerable reduction of 89.3% at the six-month follow-up (timepoints: 1 vs. 3). Comparable reductions of 78.6%

and 86.4% were noted in the P (Pilates) group. However, these intergroup variances did not attain statistical significance. Regarding quality of life assessments, the questionnaire outcomes revealed significantly more favorable effects from Pilates exercises compared to biofeedback training. This disparity was evident both at the end of the eight-week exercise program ($p = 0.003$) and during the six-month follow-up ($p = 0.0009$).

RESULT

Our search produced 14 results. After looking at the titles and summaries, we found 12 papers that fit our criteria. At first, we excluded several articles because they were written in review style. But after reading the full papers carefully, we included five papers in our final analysis. These papers included a retrospective observational study and several case reports.

The study by Wang et al following the Declaration of Helsinki and approved by the Hospital Institutional Review Board, involved 108 primiparas split into audio (n=54) and control (n=54) groups, aged 23–34 years, with mild (87.0%) or moderate (13.0%) stress urinary incontinence. Most participants completed the follow-up (90.7%). Both groups showed no significant differences in demographics or symptom severity at baseline.[6]

Primary outcomes revealed notable improvements in symptom severity after three months of training, with no statistically significant differences between the groups. The audio group displayed higher self-efficacy throughout the follow-up period, contrasting with decreased self-efficacy and outcome expectations in the control group. [6]

Secondary outcomes indicated fewer cases of pelvic floor muscle injury at six months postpartum in the audio group compared to the control (12.5% vs. 34.0%). Additionally, the audio group exhibited greater pelvic floor muscle contraction amplitudes and fewer instances of bladder neck descent at different postpartum intervals. Female Sexual Function Index scores were significantly higher in the audio group at six months postpartum compared to the control group. [6]

Vigil et al in 2021 conducted a retrospective cohort study involving adult females who underwent SUI surgery in Ontario, Canada, utilizing data from the Institute for Clinical Evaluative Sciences. A total of 74,968 women underwent surgery during the study period, with 64,501 in the mesh group, 10,467 in the nonmesh group, and 5,505,576 in the control group. The median follow-up time was 8.5 years. The baseline characteristics showed a median age of 53, with 40% of women aged 18-49. The number of mesh surgeries increased until 2009, then declined, while nonmesh surgeries remained stable until 2005 and then decreased significantly. Most women resided in urban areas and were evenly distributed across income quintiles. Women undergoing surgery had higher comorbidities and more frequent GP or gynecologist visits before the index date compared to controls. [7]

The incidence of pelvic malignancies was lower in the SUI surgery groups than in the control group. After adjustments for age, demographics, and comorbidity, women who had surgery showed a reduced risk of pelvic malignancy regardless of surgery type. Both mesh and nonmesh SUI surgery groups displayed consistently lower risks across various pelvic cancer sites compared to controls. Factors associated with increased risk of pelvic malignancy included obesity, frequent GP and gynecology visits before surgery, and nulliparity at or above 40 years. However, a history of nonmesh POP repair or pregnancy was linked to a reduced risk of pelvic malignancy. [7]

Karjalainen et al in a retrospective cross-sectional study, data from 878 consecutive women at a tertiary urogynaecology clinic were analyzed. These women presented various pelvic floor dysfunctions: 72% reported SUI, 69% had urgency urinary incontinence, 53% had POP symptoms, and 35% had voiding dysfunction. All underwent routine assessments, including standardized interviews, clinical exams (per Pelvic Organ Prolapse Quantification system), urodynamic testing, and sonographic assessments.[8]

Among the 424 women with urodynamic stress incontinence, 85% had overt SUI, and 15% had occult SUI. Significant cystocele was observed in 32% of these women, with type II in 42% and type III in 58%. Analysis showed that women with occult SUI tended to be older, had specific POP-Q values, and more bladder descent than those with overt SUI. Type III cystocele was more common among those with occult SUI. Additionally, they reported fewer urgency urinary incontinence symptoms but more frequently had urodynamic detrusor overactivity, although not statistically significant.[8]

Multivariable regression revealed significant associations with age, cystocele type, and the absence of urgency urinary incontinence symptoms. Each additional year of age increased the odds of occult SUI by 5%. Having a cystocele with an intact retrovesical angle (type III) increased the odds by 10.9 compared to one with an open retrovesical angle (type II). Not having urgency urinary incontinence symptoms independently predicted occult SUI.[8]

Weber-Rajek et al conducted randomized controlled trial where both experimental groups, significant improvements were observed in depressive symptoms (BDI-II), urinary incontinence severity (RUIS), and quality of life (KHQ) in specific

domains, including "social limitations," "emotions," "severity measures," and "symptom severity scale." Additionally, self-efficacy beliefs (GSES) improved notably in the group that received ExMI (EG2). Conversely, the control group displayed no significant differences across measured variables. Comparing the three study groups, statistically significant differences emerged at the final assessment, particularly in quality of life domains such as "physical limitations," "social limitations," "personal relationships," and "emotions." Notably, significant distinctions were evident among the study groups in quality of life measures related to physical limitations (KHQ–2B), social limitations (KHQ–2C), personal relationships (KHQ–2D), and emotions (KHQ–2E).The subsequent stage involved a post hoc Conover-Iman test, revealing no significant differences between experimental groups but highlighting statistically significant disparities between the experimental groups and the control group across all analyzed variables.[9]

This study by Chmielewska et al. involved women aged 45 and above referred to a specialist clinic for urinary incontinence symptoms. Those diagnosed with stress urinary incontinence were invited to pelvic floor muscle training. The inclusion criteria encompassed specific symptoms, frequency of leaks, and symptom distress. Initially, the BF group comprised 18 women (mean age 52.9) while the P group included 13 women (mean age 51.5) for analysis after exclusions. The BF and P groups displayed no significant differences in various factors initially and showed distinct outcomes after training. In the BF group, significant changes emerged in micturition frequency, nocturia, number of incontinent episodes, and quality of life scores at different time points. Conversely, the P group showed differences in incontinence episodes, quality of life scores, and ICIQ–UI SF scores across time points.[10]

The sEMG activity analysis demonstrated significant differences between the groups in resting and contraction trials, indicating varied muscle activity responses to training. The P group exhibited superior sEMG amplitudes in certain positions and trials compared to the BF group at different time points. Furthermore, comparison between the two groups regarding sEMG amplitude increases during relaxation and resting trials showed notable differences, with the Pilates group showing a higher number of participants with increased sEMG amplitudes compared to the BF group, particularly during follow-up.[10]

DISCUSSION

This study, a pioneering randomized controlled trial (RCT), explores the impact of app-guided audio training on stress urinary incontinence in first-time mothers. While participants demonstrated marked symptom improvement over the follow-up period, no significant differences were detected between the intervention and control groups. This aligns with a prior study in adult women using mobile device instructions (Araujo et al., 2019).[11] However, contrasting findings from Asklund et al. (2017) revealed significant symptom improvements in the app-guided group at 3 months, likely influenced by differing control group treatments. [12]

The study highlights the challenge of detecting differences in mild symptoms prevalent during pregnancy, as echoed in various cohort studies. Additionally, adherence to pelvic floor muscle training, gauged through self-efficacy, notably improved in the audio group, consistent with earlier studies. However, this study's extended follow-up period sheds new light on adherence trends post-intervention, ascertaining clinical significance.[11,14] Objectively, the audio guidance training demonstrated notable enhancements in pelvic floor muscle strength and bladder mobility. Nevertheless, inconsistent findings among pregnant women from prior studies call for further exploration, given the divergence in study designs and indicators. The study emphasizes the need for more objective measurements in evaluating pelvic floor muscle training efficacy. Moreover, the study's findings suggest a significant improvement in postpartum sexual function attributed to the audio-guided training. However, ongoing heterogeneity in existing research necessitates standardizing measurement tools for comprehensive evaluations.[7,11,14]

In our extensive population-based study, we found no evidence linking SUI surgery, with or without mesh, to an increased risk of pelvic malignancy over an average follow-up of 8.5 years. These results, aligning with a limited body of research on mesh carcinogenicity, provide a larger sample size, longer follow-up duration, and comprehensive outcome evaluation compared to previous studies. Notably, recent research evaluating patients treated with pelvic mesh, including midurethral sling and mesh for POP, over six years found no increased cancer risk compared to control groups.[7]

Lower rates of pelvic malignancies in those treated for SUI, mesh or not, might be due to two factors: healthier patients opting for surgery to improve their quality of life and the possible identification of malignancies during SUI assessments, leading to their prioritized diagnosis and treatment before surgery. However, factors like obesity and nulliparity remain recognized independent risk factors for pelvic malignancy. Hence, the reduced risk associated with SUI surgery might be influenced by biases in patient selection and unmeasured factors rather than a true protective effect. [7]

These findings counter concerns expressed by some patients and the public regarding mesh and cancer development. While historical studies in animals and case reports have fueled these concerns, contemporary research indicates that the physical properties of the implant, rather than its chemical composition, dictate its potential for carcinogenicity. Our study

underscores that modern polypropylene mesh, with its microporous and monofilament structure, likely doesn't carry the same risks seen in earlier animal studies. [7]

Despite its strengths, such as a large patient population and robust outcome assessment, our study isn't without limitations. Residual biases within an observational study, restrictions in database details like mesh type and smoking status, potential loss to follow-up due to patient relocation, and the possibility of a latency period in cancer development beyond our observed time frame are factors that warrant consideration. [7]

Retrospective observational study suggests that women with a cystocele type III (intact retrovesical angle) may have a higher likelihood of occult SUI compared to those with type II (cystourethrocele, open retrovesical angle), with the odds of occult SUI being approximately 11 times higher in type III cystocele cases. The mechanism behind this association appears to involve urethral kinking often observed in type III cystocele cases, leading to urethral obstruction and reduced urinary flow rates, potentially masking exertion-related leakage.[8]

The distinction between these cystocele types might not be common practice among urogynaecologists, but it seems clinically relevant. Translabial ultrasound offers a safe and convenient method to assess the bladder neck's functional anatomy, aiding in identifying these distinct cystocele types. Age was associated with occult SUI in this study, possibly due to differences in urodynamic testing pressures and confusion between urgency urinary incontinence and SUI symptoms. [8]

While factors associated with occult SUI are not extensively studied, larger cystocele size and various patient-related factors have been inconsistently linked to de novo SUI after pelvic organ prolapse (POP) surgery. However, in this study, the size of prolapse did not significantly predict occult SUI when adjusted for cystocele type, suggesting that bladder neck functional anatomy might play a more critical role than prolapse size. [8]

These findings deepen our understanding of occult SUI mechanisms, proposing that bladder neck anatomy is more relevant than prolapse size. Additionally, it reinforces the existence of two clinically distinct cystocele types and suggests that distinguishing between these types could aid in clinical assessments and decision-making. However, further research is needed to validate these findings before implementing them into routine clinical practice.

The study evaluated physiotherapy's impact on stress urinary incontinence (UI) in women, examining physical and psychosocial factors. Using tools like the Revised Urinary Incontinence Scale (RUIS) and King's Health Questionnaire (KHQ–2G), they noticed significant improvements in UI severity for both pelvic floor muscle training (PFMT) and Exercising-Muscle Intervention (ExMI), aligning with prior studies. Myostatin levels, linked to muscle inactivity, were lower post-PFMT and ExMI, suggesting potential benefits in treating stress UI. Depression reduction was significant post-treatment for both groups. Quality of life improved notably across various domains after both treatments. [9]

High self-efficacy pre-treatment might have motivated patient involvement. However, ExMI saw increased self-efficacy, whereas PFMT didn't show notable changes. Withdrawals occurred due to discomfort during ExMI, suggesting potential concerns compared to PFMT. Overall, both therapies proved effective in improving UI and associated physical and emotional aspects, although ExMI had some contrasting aspects to PFMT, warranting further consideration. [9]

The study observed minor differences in sEMG amplitude between groups across three measurement points, suggesting the training programs didn't significantly impact the pelvic floor muscles (PFM). There were no notable differences in PFM activity during sustained contractions between the groups. The authors found the eight-week training might not be enough to induce physiological changes. However, there's no universally recommended exercise protocol for sEMG biofeedback exercises for stress urinary incontinence (UI). While the study's protocol aligned with others in duration and frequency, the number of contractions per session varied. Other studies highlight increased sEMG activity and reduced leakage episodes post-sEMG biofeedback training.[10]

The lack of normalization in some previous studies limits comparisons. Surprisingly, Pilates training seemed to increase resting PFM activity, a result uncommon in prior studies. The effect of Pilates on PFM function remains relatively unexplored, though some studies suggest potential benefits. Overall, the research suggests the need for more standardized exercise protocols and careful consideration of exercise types to avoid excessive PFM load and ensure efficacy in treating UI. [10]

CONCLUSION

The app-based audio guidance training for stress urinary incontinence (SUI) in primiparas demonstrated higher adherence and maintained efficacy up to six months postpartum. This method notably improved pelvic floor muscle strength, bladder neck mobility, and sexual function compared to conventional home-based training. In a large cohort study with extensive

follow-up, SUI surgery, including mesh implantation, showed no association with later pelvic malignancies. Similarly, mesh implantation wasn't linked to malignancy risk. The type of cystocele significantly influences the likelihood of occult SUI, with Green type III cystocele associated with this condition. The anatomical differences in cystocele types might predict the risk of de novo SUI, necessitating further exploration. The study revealed that both pelvic floor muscle training and extracorporeal magnetic innervation effectively treated SUI in women, improving physical and psychosocial aspects. Participants in these groups experienced reduced depressive symptoms and enhanced quality of life, including improvements in various life domains. Pilates exercises showcased superior quality-of-life outcomes over sEMG biofeedback, while both methods had similar efficacy in addressing urinary symptoms. However, neither sEMG biofeedback nor Pilates exercises distinctly increased bioelectrical pelvic floor muscle activity during contractions. Despite some variations, these observations do not singularly favor pelvic floor muscle training with sEMG biofeedback as a more advantageous intervention for stress urinary incontinence.

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