

The association between pelvic floor exercise and the occurrence of urinary incontinence in postpartum women: A literature review

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Abstract

Introduction: Urinary incontinence is commonly associated with pregnancy and the postpartum period and is often caused by pelvic organ prolapse due to weakened pelvic floor muscles. Kegel exercises have been shown to reduce both the severity and occurrence of urinary incontinence. These exercises are considered a primary therapy and preventive measure, leading to notable reductions in incontinence incidents during pregnancy and postpartum. This study aims to further investigate the relationship between pelvic floor exercise or kegel exercise and the occurrence of urinary incontinence in postpartum women.

Method: This study is a literature review, drawing from sources in Google Scholar, PUBMED, and Science Direct, focusing on research published between 2020 and 2025. The study included only original research articles in English or Indonesian with all the required components.

Result and Discussion: From the literature search, 6 studies met the inclusion criteria. Among these, 3 studies found a significant correlation between pelvic floor (Kegel) exercise and the occurrence of urinary incontinence, 1 article indicates a significant difference in the average urinary incontinence score after the intervention between the two groups, namely the intervention group and the control group, meanwhile the other 2 articles show that although Kegel exercises increase pelvic muscle strength, there is no significant difference between the intervention group and the control group.

Conclusion: In general, pelvic floor exercise likely Kegel exercise has an effect to lower urinary incontinence, though a few studies showed no difference between intervention and control group.

Keywords: Kegel exercise; Pelvic floor exercise; Urinary incontinence; Postpartum; Pelvic muscle

1. Introduction

The postpartum period refers to the time following the delivery of the placenta until the reproductive organs return to their pre-pregnancy state. This phase lasts for 42 days or 6 weeks, but it takes up to 3 months for the genital organs to fully recover [11]. During this period, mothers require intensive care and attention due to a decline in bodily strength and the functioning of various systems [5]. Potential risks during the postpartum phase include postpartum hemorrhage, which can occur if the myometrium fails to contract properly after childbirth, causing the uterus to remain relaxed, soft, and ineffective [10].

If these risks are not promptly addressed, they can contribute to an increase in the Maternal Mortality Rate (MMR). Data from the Health Department of East Java, Indonesia, shows that the MMR in East Java for 2020 was 93.1 per 100,000

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live births, a 3.53% increase compared to 2019 (89.81 per 100,000 live births). A significant portion of maternal deaths in East Java in 2020 occurred during the postpartum period (50.3%).

To mitigate complications during the postpartum phase, it is recommended that mothers engage in early mobilization and postpartum exercises, including Kegel exercises. These exercises are beneficial for strengthening the pelvic floor muscles and improving bladder control, thus reducing the risk of urinary incontinence. Furthermore, Kegel exercises can support physiological changes in the reproductive system, enhance blood circulation to the pelvic area, aid in the healing of postpartum wounds, and provide psychological benefits, such as preventing postpartum blues and depression [1].

Urinary incontinence is commonly associated with pregnancy and the postpartum period and is often caused by pelvic organ prolapse due to weakened pelvic floor muscles. A history of urinary incontinence during pregnancy or after childbirth is a significant risk factor for developing incontinence later in life. Urinary incontinence is defined as the involuntary loss of urine. According to the International Continence Society and the International Urogynecological Association, stress urinary incontinence is the involuntary leakage of urine during physical activities, sneezing, or coughing.

Kegel exercises have been shown to reduce both the severity and occurrence of urinary incontinence. These exercises are considered a primary therapy and preventive measure, leading to notable reductions in incontinence incidents during pregnancy and postpartum. Kegel exercises strengthen the pelvic floor muscles. In a study by Boyle et al., women who performed Kegel exercises for 3 months postpartum reported fewer urinary incontinence issues within the first 12 months after childbirth compared to those who did not practice these exercises [7].

This study aims to further investigate the relationship between pelvic floor exercise or kegel exercise and the occurrence of urinary incontinence in postpartum women. The purpose of this review is to increase the knowledge of healthcare professionals, particularly midwives, and mothers about the effect of pelvic floor exercise in anticipating the risk of urinary incontinence and the other postpartum complications.

2. Material and methods

This article is a literature review that examines 6 selected articles based on specific inclusion criteria. The selected articles present original research findings on the effects of pelvic floor exercise in urinary incontinence. The articles were published between 2020 and 2025 (within the last five years) and are in either English or Indonesian. Exclusion criteria applied to any articles discussing about pelvic floor exercise and urinary incontinence using methods other than original research. The articles were sourced from several databases, including Google Scholar, PUBMED, and Science Direct. Each selected article will be analyzed descriptively, covering author, research location, study methods, study subjects, and a summary of research findings.

3. Results

Six articles—two in English and four in Indonesian—have been reviewed and analyzed as follows.

Table 1 Results of Review of 10 Articles

No	Author	Research Title	Location	Method	Subject	Result
1	Sukmawati, L., Wulandari, R., & Yani, F.	Effect of pelvic floor exercise on pelvic muscle strength in postpartum mothers	Tomo Health Center, Sumedang, Indonesia	Pre-experimental study with one group pretest and posttest design	15 postpartum women	There is an effect of pelvic floor exercise on pelvic muscle strength. Performing pelvic floor exercises influences pelvic muscle strength, including urinary incontinence.
2	Johannessen, H. H., <i>et al.</i>	Regular antenatal exercise including	St. Olav's Hospital and	Randomized controlled trial with	722 postpartum women : 383	This study shows that a moderate-intensity exercise program

		pelvic floor muscle training reduces urinary incontinence 3 months postpartum— Follow up of a randomized controlled trial	Stavanger University Hospital, Norway	intervention and control group design	women in intervention group and 339 women in control group	during pregnancy, including pelvic floor muscle training (PFMT), significantly reduces the prevalence of urinary incontinence (UI) three months after childbirth. Structured PFMT exercises are recommended for pregnant women.
3	Ningsih, M. S., Erika, Woferst, R.	The Effect of Kegel Exercises on Urinary Incontinence in Postpartum Multiparous Women	Rejosari Health Center, Pekanbaru, Indonesia	Quasi experimental with posttest design	34 postpartum women that divided into intervention group (17 women) and control group (17 women)	There is an effect of Kegel exercises on urinary incontinence in postpartum multiparous women. Additionally, statistical test results on the average post-test urinary incontinence frequency between the intervention group and the control group showed a p-value of $0.004 < \alpha < 0.05$, indicating a significant difference in the average post-test urinary incontinence scores after the intervention between the two groups.
4	Ramadilla, D. G., <i>et al.</i>	The Effect of Kegel Exercises on Urinary Incontinence in Postpartum Mothers at Nuri Private Midwife Practice, Jambi City	Nuri Private Midwife Practice, Jambi, Indonesia	Pre-experimental study with one group pretest-posttest design	41 postpartum women	Before performing Kegel exercises, the average urinary incontinence score was 4.29, with a median of 2. After performing Kegel exercises, the average urinary incontinence score decreased to 2.12, with a median of 1. The p-value of 0.000 indicates a significant difference in urinary incontinence between before and after performing Kegel exercises.
5	Tosun, O. C., Solmaz, U.	Assessment of the effect of pelvic floor exercises on pelvic	Tepecik Training and	Prospective randomized	116 women that divided into two	Following the training, the pelvic floor muscle training

		floor muscle strength using ultrasonography in patients with urinary incontinence: A prospective randomized controlled trial.	Research Hospital, Izmir, Turkey	controlled trial	groups (65 women in intervention group and 51 women in control group)	group demonstrated notable improvements in PERFECT (Power, Endurance, Repetition, Fast Contraction, Every Contractions Timed, Coordination, Timing) scores, perineometry readings, and trans-abdominal ultrasound findings, along with significant reductions in stop test and pad test outcomes. However, no differences were observed in the control group.
6	Pujiastuti, W., Yuniarti, B., Masini.	The Effectiveness of Postpartum Exercises and Kegel Exercises in Preventing Urinary Incontinence During the Postpartum Period.	Grabag II Health Center Fieldwork, Magelang, Indonesia	Quasi experimental study with posttest approach and control group design	30 postpartum women that divided into intervention group and control group	The results of the Mann-Whitney test showed a p-value of 0.473, which means there is no significant difference in the speed of urinary incontinence resolution between the intervention group (receiving postpartum exercises and Kegel exercises) and the control group (receiving only postpartum exercises).

4. Discussion

Based on a review of 6 articles, 3 indicate a significant correlation between pelvic floor (Kegel) exercise and the occurrence of urinary incontinence. These articles highlight that providing intervention in the form of Kegel exercises can resolve urinary incontinence problems faster. 1 article indicates a significant difference in the average urinary incontinence score after the intervention between the two groups, namely the intervention group and the control group. While the other 2 articles show that although Kegel exercises increase pelvic muscle strength, there is no significant difference between the intervention group and the control group. The articles used in this literature review are articles with an experimental research design so that the results of the study are reviewed before and after the intervention was given to the subject or sample.

Pelvic floor exercise is defined as an exercise to increase strength, power, endurance, and relaxation of the pelvic floor muscles. The pelvic floor refers to a group of muscles that support the organs in the pelvis. It consists of the pelvic diaphragm, which extends from the symphysis pubis anteriorly to the coccyx posteriorly, forming a hammock-like structure that supports the pelvic organs. The pelvic floor muscles consist of the levator ani muscles including the puborectalis, pubococcygeus and iliococcygeus muscles, and the coccygeus muscle [2]. A study conducted at the Tomo Health Center on 15 postpartum mothers showed that there is an effect of pelvic floor exercise on pelvic muscle strength. Performing pelvic floor exercises influences pelvic muscle strength, including urinary incontinence. In spontaneous labor, there is a 50% greater risk of incontinence and decreased pelvic muscle strength compared to labor using tools such as forceps and vacuum extraction. So the researchers provided pelvic floor exercises to postpartum mothers in

order to overcome and prevent decreased pelvic muscle strength in postpartum mothers, not only to increase pelvic muscle strength but also to prevent incontinence. Therefore, providing pelvic floor exercises has an effect on increasing pelvic muscle strength [8].

A similar study was conducted at St. Olav's Hospital and Stavanger University Hospital, Norway, on 722 postpartum women, in which women in the intervention group followed a 12-week moderate-intensity exercise program, including PFMT, guided by a physiotherapist and supplemented with home exercises. The control group received only standard antenatal care. Data were collected via questionnaires at 18–22 weeks of pregnancy and 3 months postpartum. The prevalence of UI was analyzed using the Sandvik severity index, and multivariate logistic regression analysis was used to identify risk factors for postpartum UI. This study showed that a moderate-intensity exercise program during pregnancy, including pelvic floor muscle training (PFMT), significantly reduced the prevalence of urinary incontinence (UI) three months after delivery. The effect was most pronounced in women who already had UI at baseline. Risk factors for postpartum UI included older age, UI during late pregnancy, birth weight $\geq 4,000$ g, and obstetric anal sphincter injury (OASIS). In contrast, cesarean delivery reduced the risk of UI. Structured exercise with PFMT is recommended for pregnant women. A moderate-intensity antenatal exercise program that includes PFMT has a protective effect against urinary incontinence (UI) that continues into the early postpartum period, especially in women who have previously experienced UI [3].

A study at the Rejosari Health Center also obtained consistent results. There is an effect of Kegel exercises on urinary incontinence in postpartum multiparous women. Based on a study of 17 people in the treatment group, it was found that the majority of urinary incontinence was in the moderate and severe incontinence category, but after Kegel exercise intervention for 3 consecutive days, most respondents experienced a decrease in incontinence to moderate and mild incontinence. In addition, a significant difference was found in the post-test scores of the treatment and control groups due to the presence of Kegel exercises, which are exercises to strengthen the pelvic floor muscles, especially the pubococcygeal muscles, so that a woman can strengthen the muscles of the urinary tract [4].

Urinary incontinence is the involuntary release of urine. Pregnancy and childbirth cause the pelvic floor to weaken due to the descent of the baby's head so that it cannot function properly, because the muscles stretch during the birth process. Research by Ramadilla et al. showed that giving Kegel exercises is very influential in reducing the level of Urinary Incontinence. This is due to the very good cooperation between respondents and researchers so that the procedure for giving Kegel exercises can be carried out optimally. In reducing the level of Urinary Incontinence, it is better to do it first with non-pharmacological methods, if pharmacological methods such as giving drugs and surgery are used too often, it is feared that it will cause dependence on drugs and in the long run will burden the kidney system. One technique that can be used to prevent and overcome Urinary Incontinence is the Kegel movement. This Kegel exercise movement aims to strengthen the periurethral and perivaginal muscles so that mothers are able to control urine output optimally. [6].

One of the previous studies in Turkey stated that Following the training, the pelvic floor muscle training group demonstrated notable improvements in PERFECT (Power, Endurance, Repetition, Fast Contraction, Every Contractions Timed, Coordination, Timing) scores, perineometry readings, and trans-abdominal ultrasound findings, along with significant reductions in stop test and pad test outcomes. However, there was no significant difference between the control group and the intervention group when measured statistically [9]. In line with this study, a study by Pujiastuti et al. also stated that although Kegel exercises have the potential to solve urinary incontinence problems, there was still no significant difference between the intervention group (receiving postpartum exercises and Kegel exercises) and the control group (receiving postpartum exercises only). This is related to the presence of other factors that can influence the occurrence of urinary incontinence [5].

5. Conclusion

The review of six journal articles reveals that most indicate a relationship between pelvic floor exercise or Kegel exercise and urinary incontinence. The applicance of pelvic floor exercise could lower the occurrence of urinary incontinence better than group that not given an intervention (Kegel exercise). Some studies indicate that there is no significant differences between control and intervention group. However, giving Kegel exercises can still overcome the problem of urinary incontinence even though statistically there is no significant difference between the two groups in several studies. The intervention likely postpartum exercise to increase the strength of pelvic muscle should be applied and improved by healthcare professional in order to minimize the risk of complications in postpartum related to pelvic organs.

Compliance with ethical standards

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Disclosure of conflict of interest

No conflict of interest to be disclosed.

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