

Pelvic Floor Dysfunction Among Spontaneous Vaginal Delivery And C-Section In Multigravida

Shaban Ali

Clinical Physiotherapist At Sialkot Iqbal Hospital Badiana

Email: alishaban2547@gmail.com

Kiran Iqbal

Assistant Professor at University of Sialkot Email: Kiraniqbal216@gmail.com

Rubab Asif

Assistant Physiotherapist at GMC Email: asifrubab0@gmail.com

Ameena Amjad

Junior Assistant Therapist At Ghurki Trust Teaching Hospital

Email: drameenaamjad@gmail.com,

Maryam Khalid

General Practitioner At Hospital Wazirabad Email: khalidmaryam933@gmail.com,

Raveena Rajput

HOD at University of Sialkot

ABSTRACT

Objective: To compare the occurrence of pelvic floor dysfunction among multigravida women who gave birth by cesarean section and those who gave birth by spontaneous vaginal delivery.

Material and Methods: An observational cross-sectional study was carried out on a sample of 323 married women aged 25-40 years with a history of more than one delivery in hospitals of Sialkot using purposive sampling. Women who had urinary tract infection, pelvic surgery or perineal trauma were excluded. Structured questionnaires comprising of demographic and obstetric history and the Pelvic Floor Distress Inventory (PFDI-20), which measured urinary, colorectal-anal, and prolapse symptoms were used to collect the data. Each set of domain scores were on a range of 0-100, and the overall range was 0-300, with the higher the score, the higher the dysfunction. The statistical analysis was conducted in SPSS V.26, with descriptive statistics and the Mann-Whitney U test.

Results: Among the interviewees, 162 (50.2 percent) delivered through C-sections and 161 (49.8 percent) via vaginal delivery. In total, 58.8% experienced moderate levels of distress, 28.5% mild, 7.7% none and 5% severe. By domain: prolapse symptoms were moderate in 35 percent and severe in 11.8 percent; colorectal-anal symptoms were moderate in 44.9 percent and severe in 10.8 percent and urinary symptoms were moderate in 44.3 percent and severe in 20.1 percent in participants.

Mean dysfunction scores in women with SVD were always greater in comparison to women having C-sections, and all domains had significant differences ($p < 0.001$).

Conclusion: PFD is a typical postpartum complication, and its severity is associated with vaginal delivery, as opposed to cesarean section. Even though C-section has a protective effect, it does not remove risk. Regular postpartum check, awareness, and specific physiotherapy are needed to avoid complications and enhance quality of life.

Keywords: Cesarean Section, Multigravida, Pelvic Floor Dysfunction And Postpartum Complications.

Introduction

Pelvic floor dysfunction (PFD) is a set of conditions that develop as a result of muscle, ligament, and connective tissue weakness, injury, or dysfunction that help to support the organs of the pelvis (1). The major signs of PFD are Urinary Incontinence (UI), Fecal Incontinence (FI), Pelvic Organ Prolapse (POP), and Chronic Pelvic Pain (2). Among adult women, the estimates of prevalence of at least one pelvic floor disorder globally are estimated to be between 23 and 49 percent, depending on the population samples and the measurement criteria. According to local research in Pakistan, 30-40 percent of women of reproductive and postpartum age report symptoms of pelvic floor dysfunction, although the real rates might be even higher (3). Although PFD is very prevalent and particularly in women of reproductive age and older, it is under-reported because of social stigma, embarrassment, and awareness (4).

The presence of a healthy pelvic floor is crucial to continence, sexual health, childbirth, and quality of life (5). The pelvic floor is important in enforcing continence, provision of support to internal organs (bladder, uterus, and rectum), and a healthy functioning of the pelvic floor during urination, defecation, and sexual activity (6). These muscles might be weakened or damaged, and when such happens, women can suffer various painful symptoms, which greatly influence their physical, social, and emotional health. Pregnancy and childbirth are considered to be some of the most pertinent risk factors of pelvic floor dysfunction development (7).

The pelvic floor is subjected to multiple stresses during pregnancy because of the weight of the fetus, hormonal variation that make tissues more lax, postural and abdominal mechanical changes. Such alterations undermine the pelvic structures and cannot fully undo the postpartum (8). Moreover, a significant cause of strain in the pelvic floor is high intra-abdominal pressure (IAP) (9). Obesity plays a vital role in the pathophysiology of PFD in the case of chronic elevation of intra-abdominal pressure (10). Pelvic floor injury in previous pregnancies contributes to increased risk of trauma or vulnerability (11). Biomechanically, inadequate core strength and diastasis recti (abdominal muscle separation) also contribute to the maintenance of high intra-abdominal pressure, exacerbating PFD symptoms (12).

The childbirth process, and especially spontaneous vaginal delivery (SVD) is associated with high-level mechanical trauma that may stretch, tear, or compress the muscles and nerves involved in the pelvis, being complicate by the duration of the delivery, instrumental delivery, or large birth weight (13). Types of common injuries are levator ani muscle avulsion, pudendal nerve injury, and fascia rupture especially

during the second stage of labor which is prolonged or instrumental deliveries (14). Repeated C- sections may compromise the integrity of the abdominal and uterine walls, indirectly negatively impacting the pelvic stability, leading to the pelvic floor weakness and symptoms in the long run (15,16).

Parity or number of pregnancies a woman has been pregnant significantly contributes to the development of PFD. Physiological changes that occur with pregnancy include the elevation of intra-abdominal pressure, stretching of pelvic muscles and the softening of connective tissues by hormones. The effects are exacerbated by consecutive pregnancies, and hence, multigravida women are more susceptible to persistent complications of the pelvic floor (3).

PFD in women is also associated with decreased quality of life, sexual dysfunction, low self-esteem, anxiety, and social withdrawal. Incontinence and pelvic problems are stigmatized which may result in silence, underreporting, and late treatment. PF has an economic implication of causing high healthcare expenses, such as diagnostic tests, physiotherapy, surgical operations, and long-term management (17). During the postpartum period, the presence of long-term complications is linked to insufficient recovery in the pelvic floor, insufficient awareness, and absence of specific physiotherapy (12).

Despite the fact that pelvic floor dysfunction (PFD) is a childbirth complication, available evidence demonstrates discrepancies when it comes to the effects of delivery mode on pelvic floor wellbeing (18–20). Numerous researchers work on parity in general or compare nulliparous and multiparous women (21–23) but few studies concentrate on multigravida women who experience more cumulative biomechanical and hormonal burden on the pelvic floor. Moreover, there is still inconsistent evidence on the comparison of spontaneous vaginal delivery and cesarean section in this population, some studies indicate the protective nature of C- section (20,24) whereas others demonstrate that the difference is negligible (18,25). Lack of using the validated assessment tools is another limitation since a considerable part of the existing research is based on subjective measurements instead of standardized questionnaires (2,22,26,27). This research seeks to fill these gaps by empirically assessing and comparing PFD among SVD and C-section in multigravida women with a valid instrument. The available literature does not provide a comparison between the two methods of delivery with respect to PFD. The direct comparison between these two delivery modes will allow us to provide meaningful insight into the impact of the number of pregnancies on pelvic floor health and will give a narrower range of the risk factors that are specific to each group. Therefore, the study aim was to compare the effects of pelvic floor dysfunction in spontaneous vaginal delivery and C-section among multigravida.

Material and methods

An observational cross-sectional study was conducted. The study settings included Doctor Fahmida Sarfraz Hospital, Mission Hospital, and Civil Hospital Sialkot. The study was completed within 6 months after the approval from research committee. The study population was different married females from Sialkot which were recruited based on inclusion and exclusion criteria. The calculated sample size was 323 (28). Non-probability purposive sampling was used in this study.

Online ISSN

3007-3197

Print ISSN

3007-3189

<http://amresearchreview.com/index.php/Journal/about>

Inclusion Criteria:

Women aged between 25-40 years
Regular menstrual cycle
More than 1 child (19)

Exclusion Criteria:

Impaired cognition
Perineal trauma
UTI
Pelvic surgery
Vesicle fistula

Data collection tools:

Data was collected using a questionnaire which included demographic data, obstetric and gynecological history, Pelvic Floor Distress Inventory (PFDI-20), Urinary Distress Inventory (UDI-6), Colorectal-Anal Distress Inventory (CRADI-8) and Pelvic Organ Prolapse Distress Inventory (POPDI).

Data Collection Procedures:

After considering ethics and obtaining signed agreement, questionnaire was distributed to anticipated population in order to determine the impact of pelvic floor dysfunctions among c-section & SVD and Multigravida among different females of Sialkot. The questionnaire was distributed to married females in accordance with the inclusion criteria. In order to gather data for study, quantitative data via a closed-ended questionnaire was necessary. Participants' demographic information and all other study-related data was gathered manually through the research questionnaire.

Data Analysis:

The data was analyzed using the SPSS Version 26.0. Descriptive Statistics was used to evaluate the data for frequencies and percentages. Mann Whitney U test was used to compare the data for pelvic floor distress severity among C-section and SVD.

Results

The study included 323 participants, with 50.2% having C-section and 49.8% having a spontaneous vaginal delivery (SVD), indicating an almost equal distribution of participants. Descriptive statistics of participant age and pelvic floor dysfunction symptom scores is shown in table 1. Distribution of Delivery Modes is shown in table 2, Frequency and Percentage of Participants Based On Pelvic Organ Prolapse Distress Symptoms Severity (POPDI) is shown in table 3, Frequency and Percentage of Participants Based On Colorectal Anal Distress Symptoms Severity (CRAD) is shown in table 4, Frequency and Percentage of Participants Based On Urinary Distress Inventory Symptoms Severity (UDI) is shown in table 5, Distribution of Pelvic Floor Distress Levels is shown in table 6, Comparison of Pelvic Floor Dysfunction Scores by Type of Delivery (Mean Rank Analysis) is shown in table 7, Mann-Whitney U-test results comparing pelvic floor dysfunction scores by type of delivery is shown in table 8.

Online ISSN

3007-3197

Print ISSN

3007-3189

<http://amresearchreview.com/index.php/Journal/about>

Table 1: Descriptive statistics of participant age and pelvic floor dysfunction symptom scores

	N	Minimum	Maximum	Mean	St. Deviation
Age	323	24.00	45.00	32.9576	4.69881
POPDI	323	.00	116.67	33.6558	26.38407
CRDA	323	.00	87.50	36.7744	25.58135
UDI	323	.00	183.33	45.4850	27.83365
TOTAL	323	.00	278.13	115.9152	26.36125

Table 2: Distribution of Delivery Modes Among Study Participants

	Frequency	Percent	Valid Frequency	Cumulative Percent
C-Section	162	50.2	50.2	50.2
SVD	161	49.8	49.8	100.0
Total	323	100.0	100.0	

Table 3: Frequency and Percentage of Participants Based on Pelvic Organ Prolapse Distress Symptoms Severity (POPDI)

POPDI	Frequency	Percent	Valid Percent
No symptoms	61	18.9	18.9
Mild symptoms	110	34.1	34.2
Moderate symptoms	113	35.0	35.1
Severe symptoms	39	11.8	11.8

Online ISSN

3007-3197

Print ISSN

3007-3189

<http://amresearchreview.com/index.php/Journal/about>

Total	323	100	100.0
-------	-----	-----	-------

Table 4: Frequency and Percentage of Participants Based on Colorectal Anal Distress Symptoms Severity (CRAD)

CRAD Group Symptoms		Frequency	Percent	Valid Percent
CARD	No symptoms	52	16.1	16.1
	Mild symptoms	91	28.2	28.2
	Moderate symptoms	145	44.9	44.9
	Severe symptoms	35	10.8	10.8
	Total	323	100.0	100.0

Table 5: Frequency and Percentage of Participants Based on Urinary Distress Inventory Symptoms Severity (UDI)

Group symptoms		Frequency	Percent	Valid Percent	Cumulative Percent
UDI	No symptoms	51	15.8	15.8	15.8
	Mild symptoms	63	19.5	19.6	35.4
	Moderate symptoms	143	44.3	44.4	79.8
	Severe symptoms	66	20.1	20.2	100.0
	Total	323	100	100.0	

Table 6: Distribution of Pelvic Floor Distress Levels Among Study Participants

PFD Group Symptoms		Frequency	Percent	Valid Percent
PFD	No pelvic floor distress	25	7.7	7.7

	Mild overall distress	92	28.5	28.5
	Moderate distress	190	58.8	58.8
	Severe distress	16	5.0	5.0
	Total	323	100.0	100.0

Table 7: Comparison of Pelvic Floor Dysfunction Scores by Type of Delivery (Mean Rank Analysis) Mann-Whitney Test

Type of Delivery		N	Mean Rank	Sum of Ranks
POPDI	C-Section	162	103.00	16686.50
	SVD	161	221.36	35639.50
	Total	323		
CRAD	C-Section	162	102.56	16615.00
	SVD	161	221.81	35711.00
	Total	323		
UDI	C-Section	162	128.93	20886.00
	SVD	161	195.28	31440.00
	Total	323		
TOTAL	C-Section	162	96.36	15611.00
	SVD	161	228.04	36715.00
	Total	323		

The table 7 presents the rank distributions for different pelvic floor disorders categories (POPDI, CRAD, UDI) based on the mode of delivery: C-section and SVD (spontaneous vaginal delivery). For each disorder, the number of participants 323(N), mean rank, and sum of ranks are shown in the table. Across all categories, women who had SVD consistently mark higher mean ranks compared to those who had C-sections. The trend indicates that SVD could be related to elevated scores on pelvic floor dysfunction scales.

Table 8: Mann-Whitney U-test comparing the scores of pelvic floor dysfunction by the type of delivery

POPGI		CRAD	UDI	TOTAL
MANN-WHITNEY U	3483.500	3412.000	7683.000	2408.000
WILCOXON W	16686.500	16615.000	20886.000	15611.000
Z	-11.442	-11.509	-6.412	-12.674
ASYMP.SIG (2- TAILED)	<.001	< .001	< .001	< .001

The table 8 presents the results of the Mann-Whitney U test conducted to compare pelvic floor dysfunction scores (POPGI, CRAD, UDI, and TOTAL) between women who had undergone C-sections and those who had spontaneous vaginal deliveries (SVD). Most significantly, all the Asymptotic Significance (2-tailed) values are below 0.001, which means that the differences are statistically significant. The negative Z-values also suggest that participants with SVD had much worse levels of pelvic floor dysfunction in comparison with participants that gave birth through C-section. These findings indicate that the method of delivery considerably affects the health of the pelvic floor, and spontaneous vaginal delivery is positively linked to the dysfunction scores as compared to C- section.

Discussion

The primary aim of the current study was to evaluate a comparison between c-section and SVD (spontaneous vaginal delivery) in multigravida females regarding pelvic floor dysfunction, through pelvic floor distress inventory (PFDI-20). The current study was done in Sialkot and the data was gathered in Doctor Fahmida Sarfraz Hospital, Christian Memorial Hospital, and Allama Iqbal Memorial Teaching Hospital, Sialkot. The participants were selected based on the set inclusion and exclusion criteria.

The current study was conducted on 323 women in the age range of 25 to 40 years. The average age of the participants was 32.9567 (SD=4.6981). The modes of delivery were also evenly divided with 50.2% of the respondents delivering through C-section and 49.8% delivering through spontaneous vaginal delivery (SVD). The result showed that women who delivered through spontaneous vaginal delivery (SVD) had significantly more pelvic floor dysfunction compared to those who delivered via the caesarean section ($p < 0.001$) because the Z-values were negative. The mean age of the respondents was 33 years, and the majority of the respondents had moderate symptoms as indicated by PFDI-20 questionnaire. The highest scores were obtained on CRAD (42%), POPGI (28.8%), UDI (24.8%), and general distress (41.7%).

Comparable findings with this study were reported in a previous study which stated that 35% of women had developed symptomatic pelvic floor dysfunction following normal vaginal delivery. The symptoms reported were urinary incontinence (46%), fecal incontinence (36%), pain around the pelvis (64%), and pelvic organ prolapse (18%). The researchers concluded that birth trauma of the pelvic floor and multiple births predispose to the occurrence of pelvic floor dysfunction (22). Another study indicated that mode of delivery impacts pelvic floor outcomes, whereby cesarean section reduces the risk of urinary incontinence but does not protect fecal incontinence or pelvic organ prolapse. Moreover, it was noted that multiple pregnancies are associated with the heightened risk of the occurrence of UI, FI, and POP (20). Although the current study demonstrated reduced PFD scores following cesarean, there was evidence that symptoms can still occur especially in multigravida women or following extended labor. This emphasized the fact that cesarean was not a sure preventive measure, and age, BMI, and interval between pregnancies were also the contributing factors (25).

The current study indicated that there was a substantial difference in the prolapse of pelvic organs between women who delivered spontaneously (SVD) and those who delivered using a C-section (p-value <0.001). The current study revealed that women with spontaneous vaginal delivery (SVD) had greater symptoms of pelvic organ prolapse than those with C-sections. According to the Pelvic Organ Prolapse Distress Inventory-6 (POPDI-6) domain, the symptoms are classified as moderate (35.0%), mild (34.1%), none (18.9%), and severe (11.8%). These results are consistent with Tusi study who reported that vaginal delivery increased the risk of pelvic organ prolapse almost twice in comparison with C-section (HR 1.96) and indicated POP incidence of 1.5 per 1,000 people following vaginal delivery versus 0.6 per 1,000 people following C section (24). One supporting study had discovered that prolapses of pelvic organs (POP) were observed in 15 to 50 of women who delivered vaginally as opposed to approximately 10 to 20 percent of women who delivered through C-section (29). Similar findings were obtained in a study of Japanese women 6-15 months after childbirth where the PFDI-20 was used and that revealed a high prevalence of overall dysfunction of the pelvic floor (73.6%), with about 40 percent complaining of prolapse (18). Conversely, a study revealed that there was no significant difference in prolapse symptoms between the two types of delivery at 6 months postpartum and that only 8 percent of women reported bulging of the vagina irrespective of vaginal delivery or C-section (25). Another study did not find a difference in the risk of pelvic organ prolapse between assisted and spontaneous vaginal births, though both were found to have an increased risk compared to C-section. These inconsistent results could be attributed to the differences in the follow-up period and levels of parity (30).

The current study established a substantial difference in anal incontinence between women who delivered through spontaneous vaginal delivery (SVD) and those who had C-section, with SVD women having more anal incontinence (p-value <0.001). The Anal Distress Inventory-8 Domain displayed a severity of symptoms with most of the respondents presenting moderate symptoms (44.9%), then mild symptoms (28.2%). Fewer women (16.1 percent) had none of the symptoms whereas 10.8 percent had severe symptoms. Another study also reported similar findings, indicating

a prevalence of fecal incontinence (FI) and anal incontinence (AI) of 13.6% and 47.0% respectively. It was noteworthy that the occurrence of FI was higher following vaginal delivery (VD) compared to cesarean section (CS), which also reflected the findings of the current study (25). Another study that was related also discovered that the risk of having flatus incontinence rose 6.6 times following a third vaginal delivery compared to the first or second delivery. Anal sphincter laceration was reported to be one of the prominent risk factors leading to this problem in the same study (24). Another study done on the Nigerian women indicated that 15.5% prevalence of anal incontinence was seen after vaginal birth relative to 7.9% post C-section with near a twofold difference (29). The current study did not accord to the previous study, which reported that fecal incontinence did not differ significantly between women who underwent vaginal birth and those who underwent cesarean delivery (31).

In the current study, the p-value was found to be less than 0.001 showing that there was a significant difference between urinary incontinence among women who experienced spontaneous vaginal delivery (SVD) and women who underwent C-section with SVD women having higher rates of urinary incontinence. The current study presented moderate symptoms (44.3%), mild symptoms (19.5%), (15.8%) had no symptoms, and (20.1%) had severe symptoms in the Urinary Distress Inventory -6 Domain. This aligns with a different study which indicated a rate of 1.6 per 1,000 of urinary incontinence stress following vaginal delivery as compared to 0.8 per 1,000 following C-section (24). A study reported 1.67 greater risk of urinary incontinence following vaginal delivery than C-section with UI prevalence of approximately 30% one year after childbirth (32). Conversely, a study found no significant difference in urinary incontinence between groups at six months postpartum (overall UI prevalence 15%) (25). Pre-existing studies indicated that pregnancy-related changes cause urinary incontinence, and such cases are more likely in vaginal delivery because of pelvic muscles and nerve damage. Cesarean birth provided protection to some extent whereas prenatal and post-delivery UI had profound effects on the quality of life of the vaginal delivery women (33).

The results of the current study point to the significant disparity concerning the pelvic floor dysfunction (PFD) in women who gave birth to children through a spontaneous vaginal delivery (SVD) and those who delivered via a C-section. The rates of PFD were high among women who had SVD than women who had a C-section implying that the mode of delivery could also be an influential factor in the development of PFD. The findings are similar to past researches which have revealed a relationship between vaginal birth and PFD. The incidence of PFD in C-section women is lower, which could be explained by the lack of pelvic floor trauma in cases of childbirth. Pelvic floor dysfunction leads to a marked decrease in the quality of life where individuals experience physical, emotional, and social dysfunction because of the existence of symptoms like pelvic organ prolapse, colorectal-anal problems, and urinary problems. Pelvic floor muscle exercise during pregnancy and in the early postpartum period can potentially prevent urinary incontinence in late pregnancy and postpartum and lower the risk of anal incontinence. These results have significant implications on how women should be counseled on the risks and the advantages of the various modes of delivery.

Conclusion

The current study concluded that the prevalence of pelvic floor dysfunction was more common in women who delivered spontaneously (SVD) than in those who delivered by C- section.

Limitations

The influence of facilities and environment of hospitals on patient perception is not researched.

Women were reluctant to take part in the research due to lack of knowledge and misperception about this study.

Recommendations

We recommend that the selection of participants is made in different age groups to get more significant results.

Future studies should use a longitudinal research design to investigate the relationship between these variables.

Conflict of Interest: None

Funding: No external funding was received.

Use of AI: None

Authors Contributions: Shaban Ali, Kiran Iqbal, Rubab Asif and Ameena Amjad contributed to conception and design. Shaban Ali, Ameena Amjad, Maryam Khalid contributed to data acquisition. Kiran Iqbal, Raveena Rajput, Maryam Khalid, Rubab Asif and Shaban Ali contributed to data analysis. Kiran Iqbal and Raveena Rajput contributed to article drafting and revising it critically for important intellectual content. All authors approved the version of manuscript to be published.

References:

- Grimes WR, Stratton M. Pelvic Floor Dysfunction. StatPearls. StatPearls Publishing Copyright; 2022.
- Peinado-Molina RA, Hernández-Martínez A, Martínez-Vázquez S, Rodríguez-Almagro J, Martínez-Galiano JM. Pelvic floor dysfunction: prevalence and associated factors. BMC Public Health. 2023;23(1):2005.
- Gangakhedkar GR, Kulkarni AP. Physiological changes in pregnancy. Indian J Crit Care Med Peer-Rev Off Publ Indian Soc Crit Care Med. 2021;25(Suppl 3):S189.
- Peinado Molina RA, Hernández Martínez A, Martínez Vázquez S, Martínez Galiano JM. Influence of pelvic floor disorders on quality of life in women. Front Public Health. 2023; 11:1180907.
- Blanchard V, Nyangoh-Timoh K, Fritel X, Fauconnier A, Pizzoferrato AC. Importance of a pelvic floor lifestyle program in women with pelvic floor dysfunctions: A pilot study. J Gynecol Obstet Hum Reprod. 2021;50(4):102032.
- Quaghebeur J, Petros P, Wyndaele JJ, De Wachter S. Pelvic-floor function, dysfunction, and treatment. Eur J Obstet Gynecol Reprod Biol. 2021; 265:143–9.

- Health WHOR. Managing complications in pregnancy and childbirth: a guide for midwives and doctors. World Health Organization; 2003.
- de Amorim AC, Roque LC, Ito LM, de Oliveira Murer PG, Sartori MGF, Piassi GSGMSB de OLMDMMTCC de OLTVSSYPJ. Symptoms of pelvic floor dysfunctions during pregnancy and postpartum. *BMC Pregnancy Childbirth*. 2025;25(1):742.
- Dietze-Hermosa M, Hitchcock R, Nygaard IE, Shaw JM. Intra-abdominal pressure and pelvic floor health: should we be thinking about this relationship differently? *Urogynecology*. 2020;26(7):409–14.
- Sugerman HJ. Effects of increased intra-abdominal pressure in severe obesity. *Surg Clin*. 2001;81(5):1063–75.
- Rostaminia G, Peck JD, Van Delft K, Thakar R, Sultan A, Shobeiri SA. New measures for predicting birth-related pelvic floor trauma. *Urogynecology*. 2016;22(5):292–6.
- Madsen AM, Hickman LC, Propst K. Recognition and management of pelvic floor disorders in pregnancy and the postpartum period. *Obstet Gynecol Clin*. 2021;48(3):571–84.
- Juliato CRT. Impact of vaginal delivery on pelvic floor. Vol. 42, *Revista Brasileira de Ginecologia e Obstetrícia*. SciELO Brasil; 2020.
- Shafik A. The role of the levator ani muscle in evacuation, sexual performance and pelvic floor disorders. *Int Urogynecology J*. 2000;11(6):361–76.
- Chen K, Bhattacharjee S, Seidel H, Dillman DB, Strelzow JA. Association of pelvic trauma with rates of cesarean section, sexual dysfunction, and genitourinary dysfunction in a national database. *JAAOS Glob Res Rev*. 2023;7(4):e22.
- López-López AI, Sanz-Valero J, Gómez-Pérez L, Pastor-Valero M. Pelvic floor: vaginal or caesarean delivery? A review of systematic reviews. *Int Urogynecology J*. 2021;32(7):1663–73.
- Fontenele MQS, Moreira MA, de Moura ACR, de Figueiredo VB, Driusso P, Nascimento SL. Pelvic floor dysfunction distress is correlated with quality of life, but not with muscle function. *Arch Gynecol Obstet*. 2021;303(1):143–9.
- Suemitsu T, Mikuni K, Matsui H, Suzuki M, Takahashi T. Prevalence and risk factors of pelvic floor disorders after delivery in Japanese women using the pelvic floor distress inventory: a retrospective cohort study. *Cureus*. 2023;15(6).
- Wu JC, Yu XL, Ji HJ, Lou HQ, Gao HJ, Huang GQ, et al. Pelvic floor dysfunction and electrophysiology in postpartum women at 6–8 weeks. *Front Physiol*. 2023; 14:1165583.
- Hage-Fransen MA, Wiezer M, Otto A, Wieffer-Platvoet MS, Slotman MH, Nijhuis-van der Sanden MW, et al. Pregnancy-and obstetric-related risk factors for urinary incontinence, fecal incontinence, or pelvic organ prolapse later in life: a systematic review and meta-analysis. *Acta Obstet Gynecol Scand*. 2021;100(3):373–82.
- Bulbuli AC, Prajapati R. Pelvic floor muscle strength and sexual function in primigravid and multigravid women: An observational study. *Casp J Reprod Med*. 2021;7(1):8–12.

- Hameed AA, Bukhari B, Nauman M, Ali S. FREQUENCY OF PELVIC FLOOR DYSFUNCTIONS AFTER NORMAL VAGINAL DELIVERY. *Pak J Phys Ther PJPT*. 2022;
- Hambisa HD, Birku Z, Gedamu S. Magnitude of symptomatic pelvic floor dysfunction and associated factors amongst women in Western Ethiopia: a cross-sectional study. *Inq J Health Care Organ Provis Financ*. 2023; 60:00469580231171309.
- Tsui WL, Deng GH, Hsieh TC, Ding DC. Association between vaginal or cesarean delivery and later development of stress urinary incontinence or pelvic organ prolapse: A retrospective population-based cohort study. *Int Urogynecology J*. 2023;34(9):2041–7.
- Oliveira SG, Caroci-Becker A, Mendes E de PB, Riesco MLG, Oliveira R da C, Oliveira SMJV de. Pelvic floor dysfunction in primiparous women up to 6 months after delivery: cohort study. *Rev Bras Enferm*. 2021;74(05):e20200607.
- Burkhart R, Couchman K, Crowell K, Jeffries S, Monvillers S, Vilensky J. Pelvic floor dysfunction after childbirth: Occupational impact and awareness of available treatment. *OTJR Occup Particip Health*. 2021;41(2):108–15.
- Fisher-Yosef T, Lidsky Sachs D, Edel SS, Nammouz H, Zoabi AE, Adler L. Pelvic Floor Dysfunction among Reproductive-Age Women in Israel: Prevalence and Attitudes—A Cross-Sectional Study. In: *Healthcare*. MDPI; 2024. p. 390.
- Al-Badr A, Saleem Z, Kaddour O, Almosaieed B, Dawood A, Al-Tannir M, et al. Prevalence of pelvic floor dysfunction: a Saudi national survey. *BMC Womens Health*. 2022;22(1):27.
- Barca JA, Bravo C, Pintado-Recarte MP, Asúnsolo Á, Cueto-Hernández I, Ruiz-Labarta J, et al. Pelvic floor morbidity following vaginal delivery versus cesarean delivery: systematic review and meta-analysis. *J Clin Med*. 2021;10(8):1652.
- Leng B, Zhou Y, Du S, Liu F, Zhao L, Sun G, et al. Association between delivery mode and pelvic organ prolapse: a meta-analysis of observational studies. *Eur J Obstet Gynecol Reprod Biol*. 2019; 235:19–25.
- Schei B, Johannessen HH, Rydning A, Sultan A, Mørkved S. Anal incontinence after vaginal delivery or cesarean section. *Acta Obstet Gynecol Scand*. 2019;98(1):51–60.
- Gyhaugen M, Bullarbo M, Nielsen TF, Milsom I. The prevalence of urinary incontinence 20 years after childbirth: a national cohort study in singleton primiparae after vaginal or caesarean delivery. *BJOG Int J Obstet Gynaecol*. 2013;120(2):144–51.
- Lin YH, Chang SD, Hsieh WC, Chang YL, Chueh HY, Chao AS, et al. Persistent stress urinary incontinence during pregnancy and one year after delivery; its prevalence, risk factors and impact on quality of life in Taiwanese women: an observational cohort study. *Taiwan J Obstet Gynecol*. 2018;57(3):340–5.