Relationship between urinary incontinence, types of delivery and prolapse

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ABSTRACT
Introduction: Urinary incontinence (UI) can be defined as any unconscious loss of objectively verifiable urine that causes social or hygienic discomfort. As factors that may interfere with the onset are pregnancy and vaginal prolapses. Objective: The aim of the present study was to observe whether there is a relationship between UI, birth routes and numbers and prolapse (POP). Method: This is a retrospective study of 173 medical records randomly collected from the database of the Physiotherapy in Women's Health sector, 18 of these were excluded, totaling 155 records analyzed. The data collected were: demographic data (age, body mass, height and body mass index); evaluation of urinary symptoms (presence or not of urinary incontinence and type), delivery information (quantity, delivery route) and presence or not of prolapse (anterior, posterior or apical compartment). Statistical analysis was done by chi-square test (x2) and $p<0.05$. Results: The results showed that the higher the number of deliveries the more likely to have apical prolapse $x2 = 38.758$; $p= 0.003$. For the relationship between route of delivery and UTI, and the relationship between POP and route of delivery, showed significant difference for all relationships made ($p<0.05$). Another relationship that was different statistically was between the number of cesarean deliveries and posterior and apical POP. Conclusion: It can be concluded that UTI is related to POP and route of delivery, with apical and posterior POP being higher in cesarean sections.

Keywords: urinary incontinence, childbirth, prolapse, physiotherapy

1 INTRODUCTION

Urinary incontinence (UI) can be defined as any involuntary loss of urine that causes social or hygienic discomfort . (1)

Among the types of urinary incontinence, there is the stress urinary incontinence, in which there is urinary loss from the increase of intravesical pressure, higher than the urethral one, causing involuntary leakage, for example when coughing, laughing, sneezing, lifting objects, among others; Urge UI, occurs when there is a sudden strong desire to urinate and the person has difficulty in moving to the bathroom in time, and it may be caused by an increase in the detrusor contractility or increased sensitivity; mixed UI, when the urinary loss occurs by effort and also urgency. (2)

Risk factors associated with urinary incontinence include obesity, as obese women are 4.2 times more affected by UI than women with normal body mass index (BMI) (3). and age, because with age, collagen fibers decrease, muscle tissue is replaced by fat tissue and estrogen levels decrease, leading

to urethral coaptation. Thus, menopause is a risk factor, because it is the period of falling estrogen levels, responsible for the coaptation of the urethra, which provides continence (4)

Parity and pregnancy itself contribute to increased mechanical stress on the pelvic floor and, in addition to stretching, there are changes in uterine position associated with hormonal changes. In addition, diabetes causes peripheral neuropathy and peripheral vascular disease, which can lead to urinary symptoms in the general population. The main symptoms associated with diabetes are irritation symptoms, mainly polyuria, micturition urgency and nocturnal enuresis. Smoking can affect the lower urinary tract because tobacco has antiestrogenic effects on the bladder and urethra, impairing collagen synthesis, as well as causing anatomical and neurological damage to these organs. (4)

Pregnancy is considered a unique situation in a woman's life, as it brings about physical, psychological, social, and cultural changes that aim to provide the conditions for the full growth and development of the fetus, in balance with the maternal organism. (5)

Conditions of pelvic floor muscle overload, such as childbirth and excessive weight gain, cause stretching that follows the vaginal mucosa, but the fascia is inelastic and therefore can rupture or dislodge. During pregnancy, hormones change and estrogen and progesterone increase. Estrogen increases blood vessel formation and vasodilation, while progesterone has a potent vasodilatory effect, reducing the tone of arterial smooth muscle fibers. (6)

The International Continence Society (ICS) defines genital prolapse as the descent of the anterior and/or posterior vaginal walls and vaginal apex (uterus or vaginal fornix after hysterectomy). Therefore, it is a common disease with low morbidity and mortality, but it directly affects a woman's quality of life, sexuality, and daily activities. Epidemiological data are difficult to obtain because some women believe it is an inevitable part of aging or vaginal delivery, and even prefer not to disclose the condition for fear of embarrassment. (7)

Com isso, pôde-se observar que as incontinências urinárias apresentam como fator de risco para seu aparecimento, como a via de parto e a presença de prolapso vaginal. From this, the objective of the present study was to verify if there is a relation among UI, prolapse and the type and numbers of delivery in women.

2 METHODS

A survey was carried out of the medical records of women who underwent evaluation in the women's health physical therapy sector of the Physical Therapy Unit of the Marília Municipality.

Inclusion criteria were having a pregnancy prior to the evaluation. Patients who were pregnant at the time of the evaluation, patients with neurological diseases and/or congenital urological dysfunctions were excluded.

The sector has 2214 medical records, of these, 173 records were randomly analyzed, among them, 18 were excluded for not being in accordance with the inclusion criteria, thus, 155 records of women who signed the informed consent form were used, according to resolution 196/96 of the National Health Council.

The data collected from the medical records referred to the first physical therapy evaluation performed, which contained demographic data (age, body mass, height and body mass index); evaluation of urinary symptoms (presence or not of urinary incontinence and type), delivery information (quantity, delivery route) and presence or not of prolapse (anterior, posterior or apical compartment) which was done from the physical evaluation. Initially it was done the inspection and determination of the presence of prolapse and after palpation to confirm it.

3 STATISTICAL ANALYSIS

Data were analyzed by IBM SPSS Stastistics 20® software. Categorical data were related to each other by the chi-square test (x^2). The significance level used was 5% ($p<0.05$).

4 RESULTS

Table 1 is representing the characterization of the sample of 155 women that were selected and analyzed in this study.

Table 1. Characterization of the sample (n=155)

	Media	**±DP**
Age (years)	57,15	±12,97
Body mass (Kg)	74,58	±15,18
Height (m)	1,57	±0,07
BMI (Kg/m)^2	30,42	±6,13

Legend: SD= Standard deviation; Kg= kilogram; m= meter; Kg/m^2 = kilogram per square meter.

In Table 2 are the results of the number of deliveries and types, presence of urinary incontinence and the number of participants presenting, and vaginal prolapses.

Table 2. Outcomes for birth route, urinary incontinence, and prolapses.

	Yes	**No**	**Mean ± SD**
Parity	155	0	3,95 ± 2,73
Cesarean delivery	79	76	1,21 ± 2,28
Vaginal delivery	126	29	2,97 ± 2,32
Continents	12	143	-
IUU	92	63	-
IUE	132	23	-
IUM	93	62	-
Previous POP	46	109	-
Posterior POP	29	126	-
Apical POP	15	140	-

Legend: UUI= Urge Urinary Incontinence; SUI=Stress Urinary Incontinence; MUI=Mixed Urinary Incontinence; POP= Prolapse; SD= Standard Deviation.

The data in table 2 were related to each other. The relationship between the number of deliveries independent of the route and the variables UTI and POP, showed that only for the variable Apical prolapse (x^2 = 38.758; p= 0.003) showed a significant difference, pointing out that the higher the number of deliveries the greater the probability of having apical prolapses (uterine or dome collapse).

For the relationship between the route of delivery and UI showed significant difference for all variables, that is, for vaginal delivery showed relationship with the presence of UUI (x^2 =155.94 P<0.001), SUI (x^2 =155 P=0.006) and MUI (x^2 =155.002 P=0.006). The same occurred for cesarean delivery and UI (x^2 =157.63, P<0.001), SUI (x^2 =158.096 P<0.001) and TMI (x^2 =155.002 P=0.006)

For the relationship between the route of delivery and the presence of POP, it showed significant difference in all types. For vaginal delivery the relationship was positive for anterior POP (x^2 =148.313 P=0.004), posterior POP (x^2 =148.350 P=0.004) and apical POP (x=154.83 P<0.001). For cesarean delivery the same occurred for anterior POP (x^2 =149.06 P=0.006), posterior POP (x^2 =149.29 P=0.005) and apical POP (x^2 =162.038 P<0.001).

When relating the number of deliveries in each route, UTI and POP, it was observed that the greater the number of cesarean deliveries the greater the presence of posterior POP (x^2 =24.517 p=0.004) and apical POP (x^2 =51.495 p<0.001).

5 DISCUSSION

The objective of the present study was to verify if there is a relationship between UI, prolapse and the type of delivery. From the data, it is possible to observe that regardless of the type of delivery (vaginal or cesarean), UTI and prolapse (apical, posterior and anterior) occur.

As is known, vaginal delivery is a related risk factor for UTI. A history of vaginal delivery increases the rate of UTI to 60.4%, compared to 39.6% of women who had a cesarean section(4). During vaginal delivery, the pelvic floor area is subjected to pressure from the fetal head, which can cause swelling and compression of the pelvic floor tissues, nerves, and muscles during discharge. Changes or damage to the natural shape of the levator ani may affect the visceral and puborectal pubic parts, causing disturbances in the electrical activity of these muscles, and may directly impair their innervation and even cause damage to the muscles by compression. (6)

SUI and pelvic organ prolapse (POP), are related to their occurrence with increased intra-abdominal pressure, because they cause greater overload on the muscular structures and pelvic floor fascia, causing damage and lowering of the organs (7)besides UI.

SUI was the most prevalent type, corresponding to 132 cases (85%) in comparison to UI, 92 cases (59%). According to the literature, the most common type of UI is stress urinary incontinence (SUI), which affects about 86% of women, similar to the values found in the present study. The prevalence of UI varies widely depending on the age group and population studied, and affects 27%

of the world's male and female population, but it is more common in women than in men, reaching 30% to 70% of postmenopausal women. Among young women, this ranged from 12% to 42%. (8)

It is also observed that SUI has a high prevalence during pregnancy and this relationship may be due to physiological weight gain, which results in increased intra-abdominal pressure causing increased overload on the bladder and pelvic floor muscles. In addition, it is known that pregnant women with SUI have significantly less strength and thickness of pelvic floor muscles and/or a larger hiatal area at rest and during pelvic floor muscle contraction (9). Vaginal delivery and high body mass index are risk factors for the development of SUI (9)which corroborates the results of the present study, since it showed that regardless of the route of delivery SUI has a high prevalence.

Pregnancy and childbirth are risk factors, as this is related to the fact that the pelvic region presents changes in pelvic floor muscle strength. Weight gain and an enlarged uterus put pressure on the pelvic floor muscles. During pregnancy, vaginal delivery and episiotomy can also cause weakness in the pelvic floor muscle tissues. Due to the hormonal action of relaxin and progesterone, the muscle tissue increases elasticity, leading to weak muscles causing possible changes in bladder, sexual and bowel activity, which are directly involved in the support and sphincter function of these systems. (6)

Urethral hypermobility caused by mechanical injury during pregnancy and/or vaginal delivery is the main pathophysiological mechanism proposed for stress incontinence, while increased bladder afferent nerve input and detrusor hyperactivity underlying urge incontinence has not been associated with pregnancy and vaginal delivery. In the search for preventive measures against stress incontinence, cesarean section may seem like a tempting solution. However, C-section may cause other maternal and neonatal morbidities that outweigh that of vaginal delivery, arguing against the preventive use of C-section for this issue. There are risk factors of vaginal delivery that can be modified in obstetric care to prevent SUI. (10)

In the present study, it was found that the higher the number of cesarean sections, the higher the occurrence of apical and posterior POP. It is believed that it is related to pelvic floor trauma due to the passage of the fetus through the vaginal canal and to obstetric procedures. Moreover, by having weakened structures that compose the pelvic floor, pelvic relaxation leads to increased length of the fascias supporting the pelvic organs, consequently changing the anatomical positions, leading to the development of dystopias. (11)

Trauma from childbirth can damage the levator ani muscle (EAM), and avulsion of the EAM, which is a discontinuity in the three central portions of this muscle, can occur due to traumatic displacement of its bony insertion. The hiatus of the MEA is a central opening in the muscle and its enlargement is associated with the appearance of posterior POP signs and symptoms. (11)

As for apical POP, it is believed that it is either due to the passage of the fetus through the vaginal canal or to obstetric procedures that cause trauma to the pelvic floor.(11)

However, the exact cause for the occurrence of POP posterior is unknown. (12) and anterior POP, because its real prevalence is difficult to quantify for several reasons, it may be asymptomatic and difficult to detect, for embarrassment (because it is still considered a taboo subject associated with intimacy issues) or because they consider it as something normal, they do not resort to health services. (11)

The high number of pregnancies, regardless of the route of delivery, may be related to the increased rate of urinary incontinence. So far it can be observed that cesarean delivery may cause UI due to the fact that the bladder is usually detached from the uterus to allow access to the anterior segment (13) and during vaginal delivery lacerations of the anal sphincter may occur and episiotomy increased the risk of lesions of the pelvic floor muscles increasing the risk of UTI. (14)

The limitations found were that there was little research done on the specific reason that causes POP (apical, posterior) in cesarean sections. Thus, for future studies, it is suggested to find the exact cause of apical and posterior POPs in cesarean section.

6 CONCLUSION

It can be concluded that there is a relationship between UI, prolapse and type of delivery, with UI and POP occurring for both vaginal and cesarean deliveries. In addition, SUI, posterior and apical POP are more prevalent in cesarean delivery.

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