

Correlation study regarding the pelvic floor hypotonia in relation to labour, age and number of births

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Abstract

Background. During pregnancy, there is an increased pressure on pelvic floor. During labour and delivery the pelvic floor is stretched and can be damaged, leading to urine leakage, mostly during laughing, sneezing, coughing, running. This condition is called urinary incontinence. **Aim.** This paperwork aims to emphasize if there is a significant correlation between labor parameters, age, number of deliveries and the presence of pelvic floor hypotonia and urinary incontinence in women, after delivery. **Material and method.** Study was made on 24 women in the first days after delivery, ages between 21- 42 years old. 66,7% are primiparous, 33,3% are multiparous. As the assessment tools were used: stop urine test, number of perineal muscle contractions, questionnaire regarding the presence of urge urinary incontinence. **Results.** From the total number of subjects, 33.3% have stress incontinence and 29.2% have urge incontinence. There is a significant correlation between the presence of urinary incontinence and living environment [$p = 0,014$, (df.) = 1], smoking [$p = 0,014$], the onset of labor [$p = 0,014$], administration of antispasmodic medication in labor [$p = 0,010$], administration of antialgic medication [$p = 0,014$] and the duration of delivery period [$p = 0,028$]. **Conclusions.** From the 24 subjects, 62,5% of them have urinary incontinence after labor and delivery. From these, 33,3% have stress incontinence, and 29,2% have urge incontinence. After labor and delivery more affected are fast fibers of perineal muscles, responsible withholding the urine during coughing, sneezing, lifting objects, going upstairs, as well as withholding the urine in case of overflow bladder. After labor and delivery, most women have hypotonia of perineal muscles.

Key words: pelvic floor, hypotonia, correlation, labour, previous deliveries

Rezumat

În timpul sarcinii, presiunea exercitată asupra planșeului pelvin este mărită și în timpul nașterii acesta se poate întinde și se pot deteriora mușchii pelvieni, astfel încât pot apărea ușoare scurgeri de urină, mai ales la râs, tuse, strănut sau alergare. Această condiție este cunoscută sub numele de incontinență urinară. **Scop.** Lucrarea dorește să scoată în evidență existența unei corelații semnificative între parametrii travaliului, vârstă, numărul de nașteri anterioare și hipotonia planșeului pelvin la femeile aflate imediat după naștere. **Material și metodă.** Studiul s-a realizat pe un număr de 24 de lăuze în primele zile după naștere, vârste cuprinse între 21 și 42 de ani. 66,7% sunt primipare, 33,3% fiind multipare. Ca mijloace de evaluare s-au folosit testul jetului de urină, numărul de contracții ale musculaturii pelviperineale, chestionat pentru incontinența urinară de urgență. **Results.** Din numărul total de lăuze, 33,3% prezintă incontinență de stress și 29,2% incontinență de urgență. Există o corelație semnificativă între prezența incontinenței urinare și mediul de proveniență [$p = 0,014$, (df.) = 1], fumat [$p = 0,014$], declanșarea travaliului [$p = 0,014$], administrarea de antispastice în travaliu [$p = 0,010$], administrarea de antialgice [$p = 0,014$] și durata expulziei [$p = 0,028$]. **Conclussions.** Din cele 24 de lăuze luate în studiu, 62,5% dintre ele prezintă incontinență urinară în urma travaliului. Dintre acestea, 33,3% au incontinență de stress și 29,2% prezintă incontinență de urgență. În urma travaliului sunt afectate mai mult fibrele rapide din alcătuirea musculaturii pelviperineale, care intervin la reținerea urinei la tuse, strănut, ridicare obiecte, urcat scări, precum și la reținerea urinei în cazul vezicii pline. După travaliu și naștere, multe femei prezintă hipotonie a mușchilor perineali.

Cuvinte cheie: planșeu pelvin, hipotonie, corelație, travaliu, nașteri anterioare

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Introduction

Several studies emphasize that pregnancy and labour are in association with urinary incontinence in women. (1) During pregnancy, pressure on pelvic floor is increased. During the delivery, pelvic floor is stretched, leading to pelvic muscle weakness so that can appear slight urine leakage mostly while laughing, coughing, sneezing or running. This condition is known as urinary incontinence. Also, during pregnancy, hormones are loosened all ligaments and perineal muscles so that the fetus can be pushed through uterine canal during the delivery period. Even women who choose caesarian section can have a weak pelvic floor due to stress and pregnancy heaviness. (2)

Urinary incontinence is a common condition during pregnancy and after baby delivery. More than a half of women who have their first baby, and one of the three women at the second delivery experienced urine leakage. (3)

Perineal muscle help to control abdominal pressure during the exertion of pressure force oriented from up to down during physical exercise, lifting or any other activities of handling or bad posture. Pelvic floor muscle are sustaining the bladder, uterus and the bowel. They have a role in sphincters control and plays an important role in sexual function and the perception of sexual sensations. Two of pelvic muscles have the most important role. The biggest is like a hammock (pubococcygeus). The other muscle has triangle shaped (iliococcygeus). They are used for stopping the urine; therefore, they need to be strengthened.

Pelvic floor muscle is synergic with postural muscle: deep muscles of the trunk, hip (abductors/adductors), gluteus, and abdominals. Due to ageing, this group of muscle, tendons and ligaments will be weak. This situation will lead to more than urinary incontinence and can lead to the lowering of internal organs in the pelvic floor, leading to uterine or vesical prolapse. (4)

During the delivery, the pelvic floor was very much stretched and relaxed and during after birth, pelvic floor regain its shape and resistance. At this level always a relaxation of a genital hiatus and a weakness of the urogenital diaphragm and vulvar slot remains large. These changes produce disorders only when they are very much pronounced. They can

be prevented due to a correct and healed episiotomy, sustained by pelvic floor exercises. (5) Urinary incontinence (UI) is defined by the accidental leakage (involuntary). Incontinence is not a disease, but most likely a symptom. Usually, urinary incontinence does not cause important health problems, but can embarrassing and can affect patient's self-confidence. (6)

Aims

This paperwork aims to emphasize any significant correlation between labour parameters, age, number of births and the pelvic floor hypotonia, in women, immediate after delivery.

Hypothesis

The age of the pregnant woman, birth mechanism and the number of previous births are factors that have a negative impact on the pelvic floor muscle tonus. The labor itself is a risk factor for the pelvic floor muscle hypotonia, after birth.

Material and method

Subjects

The study was conducted in April, at the Maternity Hospital from Oradea, on 24 women after birth, ages between 21 and 42 years old, in the first days after the delivery. 75% of the subjects are from an urban environment and 25% from a rural environment. From the 24 confinements, 66.7% are primiparous, 33.3% are multiparous.

The initial weight is between 47-75kg. The weight at birth is between 61-90kg. The number of previous births: primiparous 66.7%, multiparous 33.3%. 83,3% never heard of intimate gymnastics. 75% from the confinements never smoked during pregnancy. The characteristics of the subjects are presented in the table I.

Assessment tools

Pelvic floor muscle force assessment

In order to assess the force of perineal muscle, the 0-5 scale was used. Value 5 is a higher score, and zero is the lower, meaning that the patient is not able to feel the muscle. Value 5 means that the subject can do over 120 contractions. The force assessment scale for perineal muscle is presented in table III. (7, 8)

Table I. Characteristics of the studied confinements (24 subjects)

Nr.crt	Variable	Med± Ab.std	Min.	Max.
1	Age (ani)	29.25± 6.51	21 years	42 years
2	Basic mean weight (kg)	62.83±8.41	47 kg	75 kg
3	Mean weight at birth (kg)	75.75±9.40	61 kg	90 kg
4	Mean high (m)	1.66±0.55	1.52 m	1.75 m
5	Previous physical activity duration (min)	28.75±11.72	0 min.	45 min.
Nr.crt	Variable	Frecv. %	Frecv.%	Frecv. %
6	Living environment	Rural 75%	Urban 25%	
7	Smoking	No 75%	Yes 25%	
8	Intensity of previous physical activity	Hard 25%	Medium 45.8%	Easy 29.2%
9	Number of previous births	Primiparous 66.7%	Multiparous 33.3%	
10	Have you heard about intimate gymnastics?	No 83.3%	Yes 16.7%	

Table II. Force level in the assessment of perineal muscle strenght

0: does not detect the right muscles
1: under 10 contractions
2: between 10 – 30 contractions
3: between 30 – 60 contractions
4: between 60 – 120 contractions
5: over 120 contractions

Table III. Labor characteristics

Nr.crt.	Variable	Frecv. %	Frecv. %	
1	Labor induction	Natural 75%	Provoked 25%	
2	Antispastic medication	No 66.7%	Yes 33.3%	
3	Antialgic medication	No 75%	Ye 25%	
4	Labor finality	Natural 66.7%	C - section 33.3%	
Nr.crt.	Variable	Med± Ab.std	Min	Max
5	Labor duration (h.)	7.18 h±5.8911	1.00 h.	24.00 h.
6	Expulzion duration (min.)	46.87 ±16.11	10 min.	60 min.

The Stop Urine Test

During miction subject is asked to stop the urine flow, when this is more strong.

- 0 – cannot manage to stop the urine flow;
- 1 – manage to stop only partial the urine flow;
- 2 – manage to stop completely the urine flow. (9, 10)

Questionnaire "Over Active Bladder"

This questionnaire was used during this study, and it is named "Over Active Bladder". This questionnaire

belongs to the Research Centre for Health Economy and Sanitary Technology Analysis from the Corvinus University, Budapest, authors dr. Pentek Marta Ph.D. and prof. PhD. Gulacsi Laszlo.

This questionnaire was developed in 2011, as a research report in an investigation program for urinary incontinence and problems of urine drainage. This questionnaire is a part of a global screening, for health protection, in Hungary, between 2010 and 2020.

The questionnaire consisted of two parts: a general questionnaire and the questionnaire for urge incontinence. The general questionnaire has the following questions: age, weight, high, number of

births normal or C-section, if the woman is stressed, smoking, chronic diseases like coughing, sneezing, and the quantity of liquids ingested on a daily bases. The questionnaire for urge incontinence has questions like: the sensation of urge urine drainage, if there are some urine loss and when this is happening, the ability to voluntarily stop the urine, the degree of unpleasant feeling caused by involuntary urine loss. (11)

Results

Here we present the test results for pelvic muscle tonus assessment and involuntary urine loss following birth. Also, there are presented the results for the correlation between the presence of urinary incontinence with environment, number of previous births, smoking, labour induction, antalgic and antispastic medication administration, duration of the expulsion. The results were statistically analyzed with SPSS 15.0 software.

In the table III, are presented the results from the assessment of labor characteristics. Because the variables are nominals and dichotomic, these results are presented as frequency, more exactly the percentage (%). In order to analyze the correlation between nominal variables, Chi2 test was used.

75% subjects had a natural birth, and only 25% had an induced labor. During labor, 33.3% women had administered antispastic medication and 25% had administered antalgic medication. 66.7% from

women labour had finalized with natural birth, and in 33.3% from women, labor had finalized with C section. Labor lasts an average of 7.18 hours, minimum duration being 1 hour, with a maximum of 24 hours. Duration of delivery had an average of 47 minutes, with a minimum of 10 minutes and a maximum duration of 1 hour.

In the following tables are presented the results from perineal muscle strength assessment, using stop urine test and the number of perineal muscle contractions.

As we can see in table IV, from the 24 confinements, 50% managed a complete stop of urine flow. It means that the labor had not such an impact on pelvic floor so that to lead to urine leakage. 29.2% from women can stop partially the urine flow, and 20.8% are not able to stop the urine flow at all. Most of the confinements (41.7%) can do between 10-30 contractions. 20.8% can do between 30 - 60 contractions and 12.5% can do between 60 - 120 contractions and only 8.3% can do over 120 contractions of perineal muscle. 8.3% from women cannot detect the right muscle 8.3% can do under ten contractions. These results allow us to affirm that after the labor, most of the women have hypotonia of pelvic floor muscle.

Tabel IV. Perineal muscle strength assessment scores

Stop urine test		Number of correct muscle contractions	
cannot stop the urine	20.8%	0: does not detect the right muscles	8.3%
stop the urine partially	29.2%	1: under 10 contractions	8.3%
stop the urine completely	50%	2: between 10 - 30 contractions	41.7%
		3: between 30 - 60 contractions	20.8%
		4: between 60 - 120 contractions	12.5%
		5: over 120 contractions	8.3%

Tabel V. Urinary incontinence types

Urinary incontinence types	Frecv.	Percent
Does not have incontinence	9	37.5%
Urge incontinence	7	29.2%
Stress incontinence	8	33.3%

Tabel VI. The correlation between urinary incontinence and previous births, life style and labour parameters

Nr.crt.	Urinary incontinence
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Previous births	p=0.102
Living environment	p= 0.05
Labor induction	p= 0.014
Smoking	p= 0.014
Antispastic medication	p= 0.010
Antialgic medication	p= 0.014
Duration of delivery	p= 0.028

A study regarding the effects of vaginal birth on the pelvic floor demonstrates the presence of pelvic floor hypotonia after birth. (12) Concerning the type of urinary incontinence, from the 15 women who have this condition, 33.3% have stress incontinence, and 29.2% have urge incontinence. Because of the presence of those two types of incontinence, we may say that delivery affect mostly tonic fibers than phasic fibers from perineal muscles. They are responsible with withholding urine during coughing, sneezing, lifting objects, going upstairs, as well as holding urine in case of overflow bladder. (table V)

There is a significant correlation between living environment and the presence of urinary incontinence [$p = 0,014$, (df.) = 1]. There is an increased prevalence of urinary incontinence in subjects from a rural environment, the number of subjects with stress incontinence being the same with those of the subjects with urge incontinence.

In subjects from the urban environment, urinary incontinence is present just to three subjects, one suffering from urge incontinence and two from stress incontinence. In primiparous 6 has not urinary incontinence, 4 have urge incontinence and 6 have stress incontinence. In multiparous subjects, 3 does not have incontinence; 3 have urge incontinence and 2 have stress incontinence. Results that most of the subjects have incontinence problems.

There is no significant correlation between previous birth and the presence of urinary incontinence [$p = 0,102$]. Six from the subjects does not have urinary incontinence and other 6 have stress incontinence, and 4 have urge incontinence.

On multiparous women, three does not have incontinence; three have urge incontinence and two subjects have stress incontinence. In uniparous, stress incontinence (present at ten from primiparous) is more frequent than at multiparous (where urge incontinence is only in 5 women). Even that, a Norwegian study regarding the correlation between the number of birth and urinary incontinence show that the number of birth is a risk

factor for the development of urinary incontinence. (13)

There is a significant correlation between the type of urinary incontinence and the subjects who are smoking and those who don't [$p = 0,014$]. From the subjects which do not smoke, seven have done not have incontinence and other seven have stress incontinence, and four of them have stress incontinence. All the patient who re smoking has incontinence problems, 3 with urge incontinence and two subjects have stress incontinence. A study regarding the influence of lifestyle on the development of urinary incontinence in women, are showing that hard smoking tea drinking and body mass index are important risk factors for the development of urinary incontinence. (14)

There is a significant correlation between labor induction and the type of incontinence [$p = 0,014$]. From the subjects who had a natural induction of labor, seven of them had no incontinence, six have urge incontinence, and five have stress incontinence. In a subject with artificially induced labor, two had no incontinence, two have stress incontinence, and just one have urge incontinence.

There is a significant correlation between the administration of the antispastic medication in labor and the presence of urinary incontinence in studied subjects [$p = 0,010$]. All eight women who took the antispastic medication, but even those who did not take this medication (12 women out of 16) have urinary incontinence. From the women who took the antispastic medication, four of them have stress incontinence, and the other four have urge incontinence. Also, within the women who did not take the antispastic medication, 9 of them have stress incontinence and only 3 have urge incontinence. We may say that the most of the studies subjects have stress incontinence.

There is a significant correlation [$p = 0,014$] between the type of urinary incontinence and antalgic medication administration. Within the subjects with no antalgic medication intake, seven of

them have stress incontinence, and six of them have urge incontinence, and five of them have no incontinence. Subjects with analgic medication intake had no incontinence problem, but two of them, one with stress incontinence, and one with urge incontinence.

There is a significant correlation between the duration of delivery phase of labor and the presence of urinary incontinence [$p = 0,028$]. From the eight women who had C-section, five of them do not have urinary incontinence, and from the 16 who had a natural delivery, 12 of them have different types of urinary incontinence. Regarding the type of urinary incontinence, in women who had C-section, 2 have stress incontinence, and one has urge incontinence. From the women who had a natural birth, the finality of labour does not influence the type of incontinence.

Regarding the labor duration, the majority of women, who had 60 minute's duration of the expulsion, have stress incontinence. (tabel VI)

A study regarding the risk factors for urinary incontinence after pregnancy and labor emphasize that both pregnancy, labour and expulsion are risk factors for this condition in confinements. (1)

Conclusions

From the 15 women who have urinary incontinence, 33.3% have stress incontinence, and 29.2% have urge incontinence.

The living environment and smoking represents risk factors for the presence of urinary incontinence, mostly those from a rural environment.

The number of previous births does not influence the presence of urinary incontinence.

Regarding the labor parameters, the induction of labor, administration of antispastic and analgic medication, duration of labor and delivery represents risk factors for urinary incontinence. Labor induces hypotonia of pelvic floor muscles.

Therefore, we can say that after the delivery, the most affected are phasic muscle fibers of perineal muscles. They are responsible with withholding urine during coughing, sneezing, lifting objects, as well as

tonic muscle, responsible with withholding the urine during overflow bladder.

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