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Urinary Incontinence in Women and Its Relation with Pregnancy, Mode of Delivery, Connective Tissue Disease and Other Factors

Nietrzymanie moczu u kobiet i jego związek z ciążą, rodzajem porodu, chorobą tkanki łącznej i innymi czynnikami

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Abstract

Objectives. The aim of this study was to determine the relationship between urinary incontinence (UI) and parameters such as pregnancy, mode of delivery and other factors.
Material and Methods. The study was based on a questionnaire administered to 761 patients. After their age, menopausal status, number of pregnancies, number of deliveries and history of connective tissue disease (CTD) were recorded, the data were analyzed using a χ^2 test.
Results. In patients who are post-menopausal and over 40, both stress incontinence (SI) and urge incontinence (URI) were found to be significantly higher. It was also established that both SI and URI increased with the number of pregnancies. As the number of normal vaginal deliveries increased, the rate of both SI and URI increased, while increases in the number of cesarean sections affected neither SI nor URI. Among women who had had abortions, the rate of SI was higher, and it increased as the number of abortions increase. Neither the occurrence of abortions nor increased numbers of abortions influenced the rate of URI. In patients with CTD, both SI and URI increase.
Conclusions. Urinary incontinence in women seems to be influenced by the mode of delivery, menopause, age and CTD (**Adv Clin Exp Med 2012, 21, 2, 207–213**).

Key words: urge incontinence, stress incontinence, urinary incontinence.

Streszczenie

Cel pracy. Określenie związków między nietrzymaniem moczu (n.m.) a wskaźnikami, takimi jak ciąża, rodzaj porodu i inne.
Materiał i metody. Badanie zostało oparte na kwestionariuszu, który wypełniło 761 pacjentek. Po odnotowaniu ich wieku, stanu menopauzalnego, liczby ciąż, liczby porodów i chorób tkanki łącznej (CTD) w wywiadzie, dane analizowano za pomocą testu χ^2.
Wyniki. U pacjentek, które są po menopauzie i powyżej 40 lat zarówno wysiłkowe nietrzymanie moczu (w.n.m.), jak i nietrzymanie moczu spowodowane naglącymi parciami (n.m.) okazały się znacznie częstsze. Ustalono również, że częstotliwość w.n.m. i n.m. wzrasta wraz z liczbą ciąż. Wraz ze wzrostem liczby porodów siłami natury zwiększa się częstotliwość w.n.m. i n.m., podczas gdy wzrost liczby cięć cesarskich nie wpływa na częstotliwość w.n.m. i n.m. Wśród kobiet, które dokonały aborcji częstotliwość n.m. była większa; tym większa, im większa była liczba aborcji. Ani występowanie aborcji, ani ich większa liczba nie miały wpływu na częstotliwość n.m. U chorych na CTD częstotliwość w.n.m. i n.m. były większe.
Wnioski. Na występowanie nietrzymania moczu u kobiet wpływa rodzaj porodu, menopauza, wiek i CTD (**Adv Clin Exp Med 2012, 21, 2, 207–213**).

Słowa kluczowe: nietrzymanie moczu spowodowane naglącymi parciami, wysiłkowe nietrzymanie moczu, nietrzymanie moczu.

Urinary incontinence (UI) is defined by the International Continence Society as involuntary passing of urine [1, 2]. UI is one of the most commonly occurring conditions among women [3–6, 7]. It is more common in women than in men in all age groups [5]. Hunskar et al. [2, 8] found the prevalence of UI to be 20–30% among young adult women and 30–40% among middle-aged women [5]. It is a serious public health problem among women, and has physical, social, psychological and economic implications [9]. Most women do not report this complaint to physicians, as they feel ashamed [2, 8–9]. Although it is not a life threatening condition, UI is important since it impairs the quality of life.

The fact that UI is more common in women than in men indicates the contribution of factors such as fecundity and pregnancy to UI. The present study investigates the relation between UI and parameters such as the number of pregnancies and abortions, mode of delivery, age, menopausal status and history of connective tissue disease.

Material and Methods

A total of 761 patients from various age groups who had been referred to the Kecioren Education and Research Hospital gynecology clinic between January and September 2010 were included in this study. Patients with communication problems, mental retardation and neurological disturbances, as well as those who had previously undergone surgery for urinary incontinence were excluded from the study. Approval for the study was obtained from the Ethics Committee of Kecioren Education and Research Hospital, and all patients consented to participate in the study in accordance with the principles of the Helsinki Declaration.

For the study, each patient's name, age and menopausal/menstruation status was recorded. If the patient was post-menopausal, its duration was recorded. The patients were asked about the presence of rheumatoid arthritis (RA), lupus and other collagen and rheumatic diseases. The presence of stress incontinence (SI) was inquired into by asking if the patient passed urine when laughing, coughing or sneezing; if so, the patient was listed as SI positive. The question "do you experience an urgent need to urinate and leak then urine before you reach a toilet?" was asked to determine the presence of urge incontinence (URI). The overall number of pregnancies, overall number of deliveries, mode of delivery and the number of induced and spontaneous abortions were recorded.

The data obtained was evaluated using SPSS software. For the descriptive statistics, percentage distribution figures were used, and in the analysis of relations, a χ^2 analysis was used.

Results

Among the total of 761 patients, SI was detected in in 272 (35.7%), and URI in 312 (41%). There were 135 patients with CTD (connective tissue disease) (17.7%).

Regarding the number of pregnancies, 7.6% had never been pregnant (n = 58); 11.4% had been pregnant once (n = 87); 22.5% had had two pregnancies (n = 171); 21.9% had had three pregnancies (n = 167); 14.5% had had four pregnancies (n = 110); and 22.1% (n = 168) had had five or more pregnancies (Table 1).

See Table 1 for the frequency of the parameters investigated: urinary incontinence, age, number of pregnancies, mode of delivery, number of abortions, menopausal status and age, and Table 2 for the analysis of relations among the parameters.

It was established that higher the age, the higher the rate of SI and URI. While the rate of URI was 20.2% between the ages of 20 and 29, it was 33.5% between the ages of 30 and 39 and 52% in the group aged 40 or more. This increase was statistically significant ($p = 0$). As to the rate of SI, it was 17% in the 20–29 age group, 33.5% in the 30–39 age group and 43.8% in the 40+ age group, which represents a statistically significant difference ($p < 0.01$)

In the comparison of pre- and post-menopausal patient groups, the rate of SI was significantly higher in post-menopausal women (46.7%) than in pre-menopausal women (31.1%; $p = 0$). The rate of URI was also significantly higher in post-menopausal women (67.4%) than in pre-menopausal women (29.8%; $p = 0$).

The rate of SI and URI increased significantly with the number of pregnancies as well ($p = 0$ in both cases).

In the analysis of the relation between the mode of delivery and incontinence, a significant positive correlation was found between SI and normal vaginal delivery (NVD). As the number of normal deliveries increased, so did the rate of SI: after one NVD the rate of SI was 7.7%; after two NVDs it was 25%; after three NVDs it was 31.3%; and after four 4 NVDs: it was 15.8% ($p = 0$). No significant relation was found between SI and the number of caesarean sections (C/S): After one C/S the SI rate was 9.9%; after two C/S it was 4.8%; after three C/S it was 0.4% ($p = 0.132$).

The analysis established that the rate of URI increased with the number of normal vaginal

Table 1. The frequency of the characteristics analysed

Tabela 1. Częstotliwość występowania badanych cech

Characteristic (Cecha)	Category (Kategoria)	Percent and number (N) (Odsetek i liczba)
Urinary incontinence (UI) (Nietrzymanie moczu)	stress incontinence (SI) urge incontinence (URI)	35.7% (N:272) 41% (N:312)
CTD (Connective tissue disease) (Choroba tkanki łącznej)	yes no	17.7% (N:135) 82.3% (N:626)
Number of pregnancies (G) (Liczba ciąż)	0G 1G 2G 3G 4G 5G	7.6% (N:58) 11.4% (N:87) 22.5% (N:171) 21.9% (N:167) 14.5% (N:110) 22.1% (N:168)
The number of cesarean sections (C/S) (Liczba cięć cesarskich)	1C/S 2C/S 3C/S 4C/S	9.7% (N:74) 6.8% (N:52) 1.4% (N:11) 0.1% (N:1)
The number of vaginal deliveries (NVD) (Liczba porodów siłami natury)	1NVD 2NVD 3NVD 4NVD	12.4% (N:94) 28.6% (N:218) 22.6% (N:172) 9.5% (N:72)
The number of abortions (A) (Liczba aborcji)	1A 2A 3A 4A	17% (N:129) 10.5% (N:80) 3.9% (N:30) 1.2% (N:9)
Age (Wiek)	20–29 30–39 40 and above	21.5% (N:163) 23.2% (N:176) 52% (N:418)
Menopausal status (Stan menopauzalny)	pre-menopausal post-menopausal	70.2% (N:531) 29.8% (N:227)

deliveries up to three NVD: After one NVD the URI rate was 8.7%; after two NVDs it was 27.2%; after three NVDs it was 27.6%. After four NVDs the rate dropped to 13.1%; after five NVDs it was 6.1%. No significant relation was found between URI and cesarean delivery: After one C/S the URI rate was 8%; after two C/S it was 4.5%; after three C/S it was 1% ($p = 0.066$).

When the rate of SI was compared between the C/S-only group and the NVD+C/S groups, the rates of SI were found to be 5.5% and 9% respectively, which represents a statistically significant difference ($p = 0$). The URI rate was 6.45% in the C/S-only group and 7.15% in the NVD+C/S group, which is also a statistically significant difference ($p < 0.01$).

The rate of SI was 30.6% in the group that had never had an abortion and 45.7% in the group that had had at least one abortion, which represents a statistically significant difference ($p = 0$). As the number of abortions increased, the rate of SI increased as well ($p = 0$). The URI rate was 41.7% among women who had had no abortions and 39.5% among those who had had at least one abortion. This difference was not statistically significant ($p = 0.557$). The rate of URI did not increase with the number of abortions.

In the analysis of the relation between CTD and urinary incontinence, the rate of SI was found to be 33.9% in women without CTD and 44.4% in those with CTD, which is a statistically significant difference ($p = 0.020$). The rate of URI was 39.6% in the group without CTD and 48.9% in the group with CTD, which is also a statistically significant difference ($p = 0.040$).

Discussion

Urinary incontinence is a serious public health problem which is quite common in women. It markedly impairs quality of life and leads to physical, social and psychological problems even though is not life threatening [7, 9].

Table 2. Results of the statistical analysis

Tabela 2. Wyniki analizy statystycznej

Characteristic (Cecha)	Category (Kategoria)	SI (%)	P	URI (%)	P
Age – years (Wiek – lata)	20–29 30–39 40 and above	17 33.5 43.8	0	20 33.5 52	0
Menopausal status (Stan menopazuzalny)	pre-menopausal post-menopausal	31.1 46.7	0	29.8 67.4	0
The number of pregnancies (G) (Liczba ciąż)	0G 1G 2G 3G 4G 5G or more	15.5 19.5 19.9 39.5 51.8 54	0	24.1 33.3 31.6 44.9 48.2 45.2	0
The number of vaginal deliveries (NVD) (Liczba porodów siłami natury)	1NVD 2NVD 3NVD 4NVD 5NVD	7.7 25 31.5 15.8	0	8.7 27.2 27.6 13.1 6.1	0
The number of cesarean sections (C/S) (Liczba cięć cesarskich)	1C/S 2C/S 3C/S	9.9 4.8 0.4	0.132	8 4.5 1	0.066
C/S+NVD (Cięcie cesarskie + siłami natury) C/S only (Tylko cięcie cesarskie)	yes yes	9.6 5.5	0	7.1 6.4	0
Abortions (A) (Liczba aborcji)	no yes	30.6 45.7	0	41.7 39.5	0.712
Connective tissue disease (Choroba tkanki łącznej)	yes no	64.4 33.9	0.02	48.9 39.6	0.040

Urinary incontinence is more common in women than in men [2]. Based on the idea that factors associated with fecundity (pregnancy, delivery, abortion, menopause) may be associated with this, the authors investigated the relation between the aforementioned factors, as well as connective tissue disease, and urinary incontinence in a total of 761 patients.

It is well known that incontinence increases with advancing age and menopause [10, 11]. The weakening of the muscles in the pelvic floor (as in the rest of the body) with increasing age may cause this. In this respect, the results of the current study are congruent with those reported in the literature: The investigation showed that both SI and URI rates in women increase with advancing age ($p = 0$). In addition, in menopausal women, the rate of URI was significantly higher than that in pre-menopausal women. Moreover, when the rates of SI and URI were compared in menopausal patients, URI was established to be more common than SI, which indicates that urge incontinence may become more common with menopause.

The current study also established that the rates of both SI and URI increased with increasing number of pregnancies ($p = 0$ in both cases). These results are consistent with the literature and confirm that pregnancy is a risk factor irrrespective of the mode of delivery [12, 13]. With each pregnancy, a woman's body is exposed to reproductive hormones to a greater degree, and some of these hormones – especially relaxin – increase urinary incontinence in due to the relaxation of connective tissue [14, 15]. During pregnancy, the rate of urinary incontinence increases, independent of infection [10, 16–21]. Although a previous study suggested that the first birth has the most impact on urinary continence, in the present study it was determined that the rate of urinary continence has a positive correlation with the number of pregnancies [22, 23]. Even if they do not culminate in delivery, each increase in the number of pregnancies increases the rate of UI. In some previous studies, the relation between mode of delivery and urinary incontinence was investigated and it was determined that in some cases vaginal delivery increased the rate of urinary incontinence [12, 23–31]. In the present study, the relations between mode of delivery and URI and SI were analyzed separately. Although a signifi-

cant increase in SI was established with increasing numbers of pregnancies (p = 0), there was no significant relation between SI and caeserean delivery (p = 0.132). The same was true for URI. As the number of normal deliveries increased, the rate of URI increased as well (p = 0), while the number of C/S did not have any such effect (p = 0.066), which is consistent with the literature [23–31]. These results suggest that pelvic floor impairment may occur during normal delivery [12, 32–34]. In the Norwegian EPINCONT study, the risk of URI was found to be higher in normal vaginal delivery [24]. Urinary leaks immediately after birth are a risk factor for the development of long-term incontinence [12, 35]. In the present study, cesarean section seems to offer protection from urinary incontinence; when elective C/S, post-labor C/S and pushing/expulsion C/S were compared, the risk of urinary continence was found to be the same in all of them [23]. The later stages of the fetus's descent through the vagina during delivery seem to cause the major negative effect on continence, possibly because of connective tissue damage due to episiotomy [23]. Hypoxic muscle damage due to mechanical pressure may also play a role [23]. When muscle-relaxing factors, which are already increased during pregnancy, are added to all of these, incontinence following vaginal delivery seems inevitable. All of these factors should be investigated in more detail.

In the present study, there was a group of women who had delivered both vaginally and by C/S. In the C/S-only group, the rate of SI was found to be 5.5%, while in the C/S+NVD group it was 9.6% – a significant difference (p = 0). The same was true for URI. These results suggest that in the patient group with two modes of delivery, both types of incontinence occur at significantly higher rates. This means the longterm efects of vaginal delivery after C/S are open to debate. After undergoing C/S once, vaginal delivery does not seem to be very reasonable for the woman's comfort.

In addition, in the present study, patients who had undergone induced or spontaneous abortion were compared with those who had not. In the abortion group, the risk of SI was found to be significantly higher than among patients who had had no abortions (p = 0). In the rate of URI, no difference was found between the groups (p = 0.557). In addition, there was a correlation between the number of abortions and the rate of SI (p < 0), but the rate of URI was not affected (p = 0.712).

The increase in the rate of SI with an increasing number of abortions may be due to the increase in the number of pregnancies, which suggests that pregnancy by itself may have an adverse effect on urinary incontinence [12]. The negative effect of induced abortion on the pelvic floor may also be influential.

In the present study, the effect of the presence of connective tissue disease on the rate of urinary incontinence was also investigated, which is an issue that has not been addressed before. SI was found to be significantly higher in women with connective tissue disease (p = 0.020); so was URI (p = 0.040). These results suggest that pelvic ligaments may be weaker in patients with connective tissue disease.

The authors concluded that urinary incontinence is quite an important clinical condition which influences women's quality of life. Its incidence increases with age, menopausal status, increasing number of pregnancies, the number of normal vaginal deliveries, the number of abortions, and also in the presence of connective tissue disease. Patients with these risk factors can be helped through exercise programs strengthening the pelvic floor. This is an important issue for women's health.

The present study emphasized some issues which had not previously been highlighted. One of them is the increase in the risk of urinary incontinence among women who have had both cesarean and normal deliveries. Although spontaneous vaginal delivery after a cesarean section seems to be useful for the patient's comfort in the short term, the risk/benefit ratio is debatable when the effect of pelvic floor damage on urinary incontinence is considered. This is especially worth attention given that an increase in the number of C/S does not increase the rate of incontinence.

In addition, patients with connective tissue disease may also usefully be included exercise programs for pelvic floor strengthening in addition to undergoing specific treatment.

The results of the present study are consistent with the literature with regard to pregnancy and delivery, but further studies with larger patient populations are required in order to clarify the effect of connective tissue disease and and induced/spontaneous abortion on urinary incontinence.

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