

## *Chapter 5*

### *Differences in urinary incontinence symptoms between women scheduled for hysterectomy and women who are not.*

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## **Introduction**

There is a contradiction between the reported long term (increased risk) and short term (relieve of symptoms) effect of hysterectomy on urinary incontinence<sup>1,2</sup> A recently published meta-analysis concluded that hysterectomy increases the odds of having urinary incontinence later in life.<sup>1</sup> In contrast, hysterectomy has been reported to relieve urinary incontinence symptoms in up to 75% of women at two years follow-up.<sup>2</sup> This is surprisingly high for a surgical procedure that is not designed to treat incontinence. Several hypothesis for this finding can be generated. First, symptoms leading to hysterectomy, like an enlarged uterus or endometriosis, may be associated with the development of urinary incontinence. As a consequence, eliminating these causal factors may relieve urinary incontinence. If this hypothesis is to be true, one might expect that the prevalence of urinary incontinence is higher in women scheduled for hysterectomy as compared to women that are not. Secondly, hysterectomy may not decrease the prevalence of urinary incontinence but improve the perception of it as a problem. This hypothesis is supported by the fact that the prevalence of depression and anxiety in women scheduled for hysterectomy is high (up to 62% for depression and 65% for anxiety).<sup>2,3</sup> Under these circumstances of mood disorders, the perception of the severity of co-existing symptoms may be altered.

A specific problem in studies on the consequences of hysterectomy is that no adequate distinction is made between stress incontinence (urinary incontinence related to physical activity or sudden increase in abdominal pressure) and urge incontinence (urinary incontinence related to feeling of urgency). Since the pathophysiological mechanism for these two types of urinary incontinence differs<sup>4,5</sup>, different effects of hysterectomy on each type may be anticipated.

In conclusion, it is very well possible that women scheduled for hysterectomy differ from those who are not with regard to the prevalence, type and bothersomeness of urinary incontinence. Without proper adjustment for these differences, one cannot reliably study the short and long term consequences of hysterectomy on urinary incontinence.

We performed a study to compare the prevalence, type and bothersomeness of urinary incontinence between women that were candidate for hysterectomy and women that are not.

## **Methods**

### *Study population*

The study population consists of two samples of women.

The first sample is a random population sample of 3200 women, between 20 and 75 years of age, that was obtained from the population registration office of a suburban area in the central part of the Netherlands in 1999. These women were invited to participate in a study on the prevalence and consequences of urogenital and defecation symptoms in the female community. All women received a questionnaire with an accompanying letter explaining the purpose of the study. Care was taken to encourage women without any symptoms to participate. A reminder was sent after four weeks to all women. Data collection was anonymous. Two-thousand forty-two women responded (63.8%). The representiveness of the sample was tested by comparing the two extremes of a single general health perception question (excellent and very poor) between the study sample and age-adjusted data from the nationwide Dutch Central Bureau of Statistics. Both groups were similar (excellent health 24.1 versus 24.0 percent and very poor health 2.3 versus 2.6 percent). To select a non-gynecological population a total of 222 women (10.8%) who had a hysterectomy or reported menstrual bleeding problems were excluded from this sample, finally leaving 1831 women (non-hysterectomy group).

The second sample consists of 414 women who were scheduled for hysterectomy (pre-hysterectomy group) for benign, non-prolapse conditions (bleeding problems, dysmenorrhoea, chronic abdominal pain, severe cervical dysplasia and mechanical problems related to uterine fibroids). They represent 90% of the 460 women that were eligible for this study (46 women (10%) refused to participate). Women were obtained from thirteen hospitals throughout the Netherlands, both teaching and non-teaching, that participated in this study. Besides hysterectomy, no additional surgical interventions were performed.

*Study design*

The community sample received a self-administered questionnaire in the second half of 1999. All women in the pre-hysterectomy sample received the same questionnaire between April 1999 and June 2000, one to three months prior to surgery. The study was approved by the local ethics committee with the restriction not to contact non-responders.

For every woman data on age, parity and educational level were collected.

Urogenital symptoms were measured with the Urogenital Distress Inventory (UDI).<sup>6</sup> The UDI consists of 19 items and each item measures if a *symptom* is present and the amount of bother the woman experiences from that symptom. The latter is measured on a four-point Likert scale ranging from not at all to greatly which was dichotomized in the analysis into: not bothersome (not at all, slightly) and bothersome (moderate, greatly). Following the recommended ICS definition of different types of UI<sup>7</sup> and in concordance with other epidemiological studies<sup>8,9</sup>, we selected two questions from the UDI. The question “do you experience urine leakage related to physical activity, coughing or sneezing?” was used as an indicator for stress-related incontinence (hereafter known as stress incontinence) and “do you experience urine leakage related to the feeling of urgency?” as an indicator for urgency-related incontinence (hereafter known as urge incontinence). Overall UI was defined as having answered positively to one or both of these questions.

Women with stress incontinence who were not at all or slightly bothered by it were regarded as not having bothersome stress incontinence (no-bothersome stress incontinence). Bothersome stress incontinence was defined as reporting moderately or greatly bother by the symptom (bothersome stress incontinence). The same dichotomization was performed to separate bothersome from no-bothersome urge incontinence

In addition, the indication for hysterectomy was obtained from the medical record for the pre-hysterectomy group.

### *Statistical analysis*

Logistic regression was used to obtain odds ratio's (OR) with 95% confidence interval (CI) for the type and bothersomeness of urinary incontinence for hysterectomy (pre- or non-hysterectomy). A multi-variate logistic regression analysis was used to adjust the odds ratio for the following potential prognostic variables: age, parity (nulliparae versus primi/multipara) and educational level (primary versus secondary/higher). A two-tailed Student's *t* test was used to compare interval data. All statistics were performed with SPSS 10.0.

## **Results**

### *Characteristics of the study groups*

Women scheduled for hysterectomy had their surgery planned for the following indications. Sixty-nine percent had bleeding problems, 13% lower abdominal pain, 8% dysmenorrhoea, 7% mechanical problems due to uterine fibroids and 3% had severe cervical dysplasia.

The characteristics of both study groups are presented in Table 1. Pre-hysterectomy women were statistically significant lower educated (OR 2.4, 95%CI 1.9 - 3.0) and more often parous (OR 2.3, 95%CI 1.7-3.1) as compared to non-hysterectomy women. There was no statistically significant difference in mean age.

### *Associations between hysterectomy and urinary incontinence*

The distribution of the type and severity of urinary incontinence are presented in Table 2. The prevalence of overall urinary incontinence, stress incontinence and urge incontinence were similar in both groups. In contrast, bothersome stress incontinence (OR 6.7, 95%CI 4.7-9.4) and bothersome urge incontinence (OR 17.0, 95% CI 9.8-29.8) were statistically significant more often reported by pre-hysterectomy incontinent women as compared to the non-hysterectomy incontinent women.

**Table 1.** Characteristics of women from the community sample and women scheduled for hysterectomy.

	<b>Non-hysterectomy</b> (n=1831)	<b>Pre-hysterectomy</b> (n=411)	<b>Significance level</b>
<b>Demography</b>			
Age (years)	45.2 (0.3)	44.4 (0.3)	NS*
<b>Education level</b>			
Primary only	363 (19.7)	152 (36.8)	<0.0001†
Secondary or higher	1468 (80.3)	259 (63.2)	
<b>Parity</b>			
0	556 (30.4)	65 (15.8)	<0.0001†
1	219 (12.0)	54 (13.1)	
2	624 (34.0)	189 (46.0)	
≥3	432 (23.6)	103 (25.1)	

\* Student's t-test, † Fisher exact test, two-tailed. NS = not significant

Values are numbers (%) or means (standard error of mean)

**Table 2.** Type and severity of urinary incontinence in relation to hysterectomy.

	<b>Non-hysterectomy</b> (n=1831)	<b>Pre-hysterectomy</b> (n=411)	<b>Significance level</b>
<b>Urinary incontinence</b>			
Urine incontinent (UI)	902 (49.3)	204 (49.1)	NS
Stress incontinence	812 (44.7)	187 (45.5)	NS
Bothersome stress incontinence	128/812 (15.7)	104/187 (55.4)	<0.0001*
Urge incontinence	375 (20.5)	87 (21.1)	NS
Bothersome urge incontinence	45/375 (11.9)	61/87 (69.8)	<0.0001*

\* Fisher exact test, two-tailed

Values are numbers (%)

*Parity, educational level and age in relation with urinary incontinence*

The association between parity and educational level and type and severity of urinary incontinence symptoms are shown in Table 3 and Table 4. Parous women reported significantly more often urinary incontinence, both stress and urge, as compared to nulliparous women. Among women with urinary incontinence, parous women were statistical significantly more likely to experience bothersome symptoms, both stress and urge, as compared to nulliparous women.

Lower educated women reported statistically significant more often urge incontinence, but not stress symptoms, as compared to higher educated women. Among women with urinary incontinence, lower educated women were statistically significant more likely to experience bothersome symptoms, both stress and urge, as compared to higher educated women.

The age of women with urinary incontinence, both stress and urge, was statistically significant higher as compared to women without urinary incontinence. Among women with urinary incontinence, no statistically significant differences in age were observed between women with bothersome and no-bothersome stress or urge incontinence. (Data not shown)

*Multivariate analysis*

As the prevalence of urinary incontinence symptoms was not significantly different between pre- and non-hysterectomy women, we only performed a logistic regression analysis to evaluate the risk for bothersome urinary incontinence (Table 5). Adjustment for parity and educational level did not substantially changed the odds for bothersome stress- or urge incontinence for pre-hysterectomy women as compared to non-hysterectomy women. Age was not included in the model as it was not significantly associated with hysterectomy or bothersome urinary incontinence.



**Table 3.** The relationship of parity and educational level with stress and urge urinary incontinence symptoms.

	Number	Stress incontinence	Urge incontinence
<b>Parity</b>			
Nulliparous	621	173 (27.9)	85 (13.7)
Parous	1621	826 (51.0)*	377 (23.3)*
<b>Educational level</b>			
Primary only	515	242 (47.0)	135 (26.2)*
Secondary/higher	1727	765 (44.3)	322 (18.7)

Values are numbers (%). \* Two-sided Fisher's exact test  $p < 0.01$

**Table 4.** The relationship of parity and educational level with bothersome stress and urge urinary incontinence symptoms.

	Bothersome stress incontinence		Bothersome urge incontinence	
<b>Parity</b>				
	n		n	
Nulliparous	173	22 (12.7)	84	9 (10.7)
Parous	826	210 (25.4)*	378	97 (25.7)*
<b>Educational level</b>				
	n		n	
Primary only	236	76 (32.2)*	132	38 (28.9)*
Secondary/higher	763	153 (20.1)	330	65 (19.7)

Values are numbers (%). \* Two-sided Fisher's exact test  $p < 0.01$

**Table 5.** Crude and adjusted odds ratio's (OR) with 95% Confidence Interval (CI) of bothersome stress- and urge incontinence for hysterectomy.

	Bothersome stress incontinence	Bothersome urge incontinence
<b>Hysterectomy<sup>†</sup></b>		
Crude	6.7 (4.7 - 9.4)	17.0 (9.8 - 29.8)
Adjusted for parity	6.5 (4.6 - 9.2)	16.2 (9.2 - 28.3)
Adjusted for parity and educational level	6.3 (4.5 - 9.0)	14.6 (8.3 - 25.7)

<sup>†</sup> Odds ratio's for pre-hysterectomy versus non-hysterectomy groups.

All OR's significant at  $p < 0.001$

## Discussion

We found that women who are scheduled for hysterectomy do not have a higher prevalence of stress- or urgency urinary incontinence symptoms as compared to women who are not scheduled for hysterectomy. However, when asking women with urinary incontinence about their perception of its severity, pre-hysterectomy women report much more often to be bothered by it as compared to non-hysterectomy women. This increased bothersomeness is more profound for urge incontinence symptoms than for stress incontinence symptoms. In addition, women with a low educational level were more likely to undergo a hysterectomy and experience urinary incontinence as bothersome as compared to higher educated women.

Apart from the fact that we compared urinary incontinence symptoms between pre-hysterectomy and non-hysterectomy women our study has two important strengths. First, we discriminated symptoms of urge from stress urinary incontinence. This is of importance since these two types of urinary incontinence have a different pathophysiological background. Secondly, we included the woman's own perception of severity of her incontinence by asking how bothersome she experienced her incontinence to be. This approach provides an estimate of perceived severity of the incontinence from the patients point of view, regardless the actual amount or frequency of urine loss.

There are several possible limitations to our study that need to be addressed. One of the concerns is that the difference in response rate between the community group (63.8%) and pre-hysterectomy group (90%) could have affected our results. Although we explicitly encouraged women without any symptoms from the community sample to participate, the reported prevalence of urinary incontinence in this group might be overestimated. However, the reported prevalence of urinary incontinence in our study is in agreement with recent studies with higher response rates (up to 84%) that used the same definition for urinary incontinence.<sup>8,9</sup> Furthermore, it is stated that samples based on voluntary responses tend to overrepresent people with strong opinions, most often negative opinions.<sup>10</sup> This would indicate that the prevalence of bothersome urinary incontinence is more likely to be overreported by the community sample than underreported.

Therefore, the true differences we found in bothersome urinary incontinence between pre-hysterectomy and the community sample may even be greater than we have reported. Another concern is that population based studies do not allow objective demonstration of urinary incontinence. We therefore cannot conclude that we measured stress or urge incontinence. Apart from the discussion if urodynamics can be regarded as the golden standard in the diagnosis of urinary incontinence, our study was designed to measure incontinence as a symptom. From this symptom-based point of view our results have to be interpreted. However, since we found substantial differences between the effects of stress and urge incontinence symptoms, we believe that our two questions indeed identified women with different types of urinary incontinence.

Hysterectomy, after caesarean section the second most performed operation in women, has been related to UI in later life.<sup>1</sup> Prospective studies on the sequella of hysterectomy that also include information on urinary incontinence are scarce.<sup>2,11-15</sup> The results, ranging between an increase in incontinence and improvement of incontinence, are difficult to compare between studies. Some studies have limited power and report on differences between urge and stress incontinence without mentioning the definitions used.<sup>14,15</sup> Other studies do not distinguish stress from urge urinary incontinence symptoms, use different definitions for the severity of incontinence, do not present results based on intention to treat (between 10.5 and 18% drop-outs) and perform additional surgical procedures for urinary incontinence without adjusting their results for it.<sup>2,11,13</sup> Our results show that, with regard to bothersome urinary incontinence symptoms, women scheduled for hysterectomy differ from those who are not. These differences have to be accounted for when analysing short and long term consequences of hysterectomy on urinary incontinence.

The differences in experienced bother between pre- and non-hysterectomy women may be explained by several hypothesis. First, candidates for hysterectomy may have larger volumes of urine loss or more frequent incontinence episodes. A comparative quantitative assessment of the amount of urine loss and frequency of incontinence episodes between women scheduled for hysterectomy and a control group has not been performed.

Since in our study no information on the frequency or volume of urine loss was available we can only speculate about its effect on bothersomeness. However, if bothersome UI would have presented itself in terms of frequent and large amounts of urine loss, it would have been conceivable that the gynaecologist would have noticed this and would have proposed additional treatment. Another hypothesis to explain the increased bothersomeness is that mood disorders among women scheduled for hysterectomy affect their perceived severity of co-morbidity. It is known that women scheduled for hysterectomy have an increased incidence of psychologic morbidity (especially depression and anxiety) as compared to the general population<sup>3,11,16</sup> Furthermore, anxious women presented themselves with complaints of UI at significantly smaller volumes of urine (measured with a 48-hour pad test) as compared to non-anxious women.<sup>17</sup> Thus, the high prevalence of mood disorders among women scheduled for hysterectomy may be responsible for reporting UI as troublesome, even at small volumes of loss.

One of the most interesting findings of our study is the relationship between educational level, hysterectomy and bothersome urinary incontinence. Low educated women are significantly more likely to experience urinary incontinence as bothersome as compared to higher educated women and are at increased risk for having a hysterectomy. Low educated women are also known to report transient and persistent health-related limitations<sup>18</sup> more often as compared to higher educated women. This implicates that at the same objective severity of symptoms, low educated women are probably more likely to experience these symptoms as bothersome as compared to higher educated women, resulting in more help-seeking behaviour. Seeking medical attention predisposes women to undergo diagnostic and therapeutic procedures, like hysterectomy. It is unlikely that educational level itself will affect the objective severity of menstrual bleeding problems or urinary incontinence. Therefore, we believe that other factors than the objective severity of problems are responsible for the increase in perceived worries about symptoms in low educated women.

For pre-hysterectomy women, we found that the odds for bothersome stress incontinence was considerably smaller than the odds for bothersome urgency symptoms (6.3 versus 14.6). Several explanations for this phenomenon can be given. First, stress and urge incontinence are different diseases.<sup>18,19</sup> Secondly, urge incontinence has been shown to have significantly more negative consequences on quality of life as compared to stress incontinence, and is therefore considered to be a more bothersome disorder.<sup>19,20</sup> Thirdly, symptoms of depression were shown to be associated with idiopathic urge incontinence and not with stress incontinence.<sup>21</sup> If depression is indeed associated with a worse perception of the severity of symptoms and also related to an increased risk of urge urinary incontinence, this may explain our findings. Finally, the sample of women with urge symptoms was smaller in number than the sample of women with stress incontinence symptoms. This is reflected in a larger 95% confidence interval of the odds ratio of bothersome urge incontinence for hysterectomy. Since the 95% confidence intervals between bothersome stress- and bothersome urgency symptoms overlap (4.5-9.0, versus 8.3-25.7) the differences may be coincidental.

In conclusion, women scheduled for hysterectomy do not report urinary incontinence more often than women who are not. This indicates that the hypothesis of a causal relationship between the symptoms leading to hysterectomy and urinary incontinence is unlikely. However, the type and bothersomeness of urinary incontinence differs significantly between incontinent pre-hysterectomy and non-hysterectomy women. This indicates that these factors, together with parity and educational level have to be considered in assessing the consequences of hysterectomy on urinary incontinence. The markedly increased odds of bothersome urinary incontinence for pre-hysterectomy women supports our hypothesis that these women have a different perception of the severity of their urinary incontinence as compared to non-hysterectomy women. One of the factors of importance in this different perception may well be the educational level or other factors related to socioeconomic status. Whether improved health after hysterectomy changes the perceived worries about urinary incontinence is still unclear but deserves further attention.

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