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ORIGINAL ARTICLE

Prevalence of urinary and fecal incontinence and symptoms of genital prolapse in women

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Background. Urinary incontinence is common in women. How often incontinence occurs has been only briefly investigated. Studies on the prevalence of fecal incontinence are few. The epidemiology of genital prolapse symptoms is unknown. This epidemiological study describes a general population of women aged 40 and 60 years with regard to the prevalence and frequency of urinary and fecal incontinence and the prevalence of genital prolapse symptoms.
Methods. A questionnaire on medical background, urinary and fecal incontinence, and genital prolapse symptoms was sent to 1000 40-year-old and 1000 60-year-old randomly selected women.
Results. Sixty-seven per cent answered: 53% were continent for urine; 9% of the 40-year-olds and 19% of the 60-year-olds had urinary incontinence weekly or more often. Detrusor instability score was significantly higher in the 60-year-olds. Incontinence of flatus, weekly or more often, was reported by 9% and 19%, loose feces by 5% and 8%, and solid feces by 0.3% and 1.7% according to the 40- and 60-year-olds, respectively. Fifty-three per cent reported no flatus incontinence. Of the prolapse symptoms investigated, 15% of the females reported pelvic heaviness, 4% genital bulge, and 12% use of fingers in the vagina or perineum by defecation.
Conclusions. Incontinence of urine is common in this population. Flatus incontinence is as common, but the concept must be operationalized if used as an endpoint in research. The International Continence Society's (ICS) definition of urinary incontinence is unpractical for use in epidemiological research. We suggest leakage weekly or more often as a criterion for significant incontinence in epidemiological research.

Keywords: detrusor instability, epidemiology, fecal incontinence, female urinary incontinence, genital prolapse

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Incontinence is an embarrassing condition. It means loss of control over the basic body functions acquired in childhood. This loss of control is deeply shameful for many women and may not be readily mentioned to their physician, even in preparation for surgery in the pelvic area.

That female urinary incontinence is common among specified groups has been shown in several publications (1–5), but exactly how often and in what situations urinary incontinence occurs in a general population is seldom stated. Fecal incontinence has been even less studied in regard to prevalence, especially when stratified for frequency of symptoms (6).

Genital prolapse is common in elderly women. Epidemiological studies of this condition in general populations are scarce because of methodological difficulties (7,8). The symptoms of genital prolapse vary, as does the perception of bother. We chose to investigate the prevalence of the

symptoms pelvic heaviness, presence of genital bulge and use of fingers on perineum or in the vagina to facilitate defecation. These symptoms have been established to be common among patients eligible for prolapse surgery and are used as indicators of genital prolapse (9).

We selected one pre- and one postmenopausal group of women with an approximately equal age distance to menopause in order to reduce the risk of predominance of bother of climacteric symptoms over the symptoms of pelvic floor insufficiency.

The aim of this epidemiological study was to describe a general population sample of women aged 40 and 60 years with regard to the prevalence and frequency of urinary and fecal incontinence as well as the prevalence of genital prolapse symptoms.

Materials and methods

In 1997, 1000 women born in 1937 and 1000 women born in 1957 were randomly selected from the county population register of Östergötland in south-eastern Sweden. Östergötland County is a mixed urban and rural area. The selected women comprised 39% of all women in the respective age group in Östergötland.

The 2000 women received a postal questionnaire concerning their medical and obstetric history, height and weight, exercise and professional activity, and urinary and fecal incontinence defined as flatus, liquid or solid stool. The incontinent women were asked how often leakages occurred. The urinary incontinent women were asked to complete a set of ten questions concerning voiding and leakage. These questions were adapted from the detrusor instability score (DIS) developed by Kauppila *et al*. for detecting detrusor instability in incontinent women (10). Detrusor instability predominates in urinary incontinent women with a DIS of eight or more often, whereas those with a DIS of less than eight were considered to have a stable bladder. The use of sanitary pads and social limitations because of incontinence were also asked. Except for the questions concerning height, weight, and number of children, which required a written number, all questions were answered by the checking boxes of prewritten options. Computerized scanning processed the returned questionnaires. Nonresponders received two reminder letters; the second letter included a new copy of the questionnaire.

The questionnaire was validated in four steps. Step 1: content validity was established by submitting the questionnaire to four gynecologists with special interest in incontinence and/or sexual dysfunction. The colleagues were asked to critically assess the questionnaire in terms of specificity and sensitivity of the questions. Alterations of the questions suggested by the colleagues were incorporated. Step 2: before the general distribution of the questionnaire, its general readability was established by having five randomly selected laywomen complete the questionnaire. After having completed the questionnaire, the five women were interviewed about their perception of each question. Step 3: 3 months after the general distribution, 30 responders were asked to complete a second identical questionnaire and the answers were compared both intraindividually and between groups to evaluate short-term reproducibility. Step 4: a further 40 of the responders were interviewed by telephone 12 months after completing the original questionnaire to establish long-term reproducibility.

A dropout analysis was performed. The 20 oldest nonresponding women in each age group received a letter stating that they would be contacted by telephone for an interview but that they could refuse to answer. Fourteen women could not be reached by telephone for various reasons. Finally, 26 of the 40 women were contacted by telephone for a brief interview: five did not want to answer and one woman did not speak Swedish; twenty women were thus interviewed.

The Ethics Research Committee of Linköping University approved the study (diary number 96314). The nonresponder analysis study was separately submitted and approved (diary number 98373).

Statistics

The kappa reliability test was used to analyze the agreement between the answers in the validation of the questionnaire (11). Nonparametric statistical tests were used to compare proportions and data on nominal scales. Category data were reported as rates and proportions. A 5% level of significance was accepted.

Results

The overall response rate after the reminders was 67% (1336/2000). There was no statistically significant difference in the response rate between the two age groups. Of the 20 nonresponders who were contacted for the telephone interview, nine (45%) stated that they had urinary incontinence. One nonresponder used sanitary protection against urinary leakage.

Reproducibility was good ($\kappa = 0.9$) when measuring the extent to which the answers to a second questionnaire were the same as those to the original questionnaire. When measured by an

interview one year later, the reproducibility was good for questions concerning obstetric history ($\kappa = 0.9$) but poor for individual answers about incontinence when stratified for frequency ($\kappa = 0.3$). However, the reproducibility for answers about all incontinences for the whole group, instead of for individuals, was acceptable ($\kappa = 0.7$) when stratified for frequency.

The rural/urban ratio among responders was similar to that of the general population in Sweden. No significant differences in the response or incontinence rate were found between town- and country-dwellers.

The prevalence of urinary and fecal incontinence is shown in Tables I and II, respectively. The prevalence of all types of incontinence was significantly higher for the 60-year-old women compared with the 40-year-olds.

In Sweden, pads for urinary incontinence are distributed free of charge to women seeking medical attention for incontinence. This commodity was used by only 45 (7%) of the women with any urinary incontinence. Among users of the free incontinence pads, 34 women (75%) had urinary leakage weekly or more often.

Tables III and IV depict individual answers to the questions adapted from the detrusor instability score (DIS) presented by Kauppila *et al.* (10).

Table I. Prevalence and frequency of urinary incontinence in 40-year-old and 60-year-old women

	Never	A few times per year	A few times per month	A few times per week	Daily
40-year-olds ($n = 643$)	58%	25%	8%	6%	3%
60-year-olds ($n = 674$)	48%	23%	10%	11%	8%

n = number of answers to the question.

Women with any urinary incontinence were asked to complete the score. Complete scores were obtained from 409 women: 193 40-year-olds and 216 60-year-olds. Leakage directly after straining was reported by 25%, and leakage after urge, a few times or mostly in 36%. Fifteen per cent of all incontinent women reported more than one habitual nightly voiding episode. Of the 106 women reporting more than one nightly voiding episode, 51 (48%) reported incontinence weekly or more often. The median DIS was three in all: three in the 40-year-olds and four in the 60-year-olds. The difference in DIS between the two age groups was statistically significant. Nightly voiding was more common in the older age group, but the difference in DIS remained significant even when the question about nightly voiding was omitted from the calculation. A DIS of eight or more was found in 20 women (5% of all): three 40-year-olds and 17 60-year-olds. Of these high scoring women, 11(55%) had urinary incontinence weekly or more often. All high-scorers reported leakage without straining and large urinary leakage volumes. The question about urinary tract infection showed no association with an overall high DIS score (data not shown).

Medical advice had been sought by 11% of all women with urinary incontinence and by less than 1% of women with fecal incontinence. Pelvic floor muscle exercises were performed daily by 9% and never by 50% of all women. These figures were not significantly different for the urinary continent and incontinent women.

Twenty-three of the women had undergone surgery for genital prolapse. Of these, nine stated current urinary incontinence weekly or more often. Seven women (0.5%) reported medication for overactive urinary bladder. Of 16 women

Table II. Prevalence and frequency of anal incontinence of flatus, liquid, and solid feces in 40-year-old and 60-year-old women

Type of anal incontinence	Never	A few times per year	A few times per month	A few times per week	Daily
Incontinence of flatus					
40-year-olds ($n = 529$)	58%	25%	8%	6%	3%
60-year-olds ($n = 524$)	48%	23%	10%	11%	8%
Incontinence of liquid feces					
40-year-olds ($n = 639$)	71%	21%	4%	4%	0.6%
60-year-olds ($n = 660$)	68%	21%	3%	5%	3%
Incontinence of solid stools					
40-year-olds ($n = 639$)	93%	5%	2%	0.3%	0%
60-year-olds ($n = 670$)	91%	6%	1%	1%	0.7%

n = number of answers to the question.

Table III. Voiding habits: individual questions and answers adapted from the Kauppila detrusor instability score

	40-year-olds	60-year-olds
Number of daytime voidings ($n=697$)		
1–7 times	85%	81%
8–10 times	10%	15%
<10 times	5%	4%
Number of night-time voidings ($n=697$)		
0–1 times	95%	77%
2–3 times	5%	20%
>3 times	0%	3%
More frequent desire to void when nervous ($n=697$)		
No	45%	45%
Sometimes	44%	50%
Often	11%	5%
Ability to stop voiding at will ($n=674$)		
Yes	81%	78%
Sometimes	19%	19%
No	0%	3%
Inability to empty bladder ($n=690$)		
No	79%	79%
Sometimes	20%	18%
Yes	1%	2%

n = number of answers to the question.
Results are given as percentages of 40- and 60-year-old incontinent women.

reporting previous surgery for urinary incontinence, six still had urinary incontinence weekly or more often.

The 621 women with urinary incontinence were asked if they refrained from specific activities because of the disorder: 142 (23%) refrained from walking for exercise, 37 (6%) from workout, 14 (2%) from work or education, and 11 (2%) from sexual activity, respectively. All types of social limitations were significantly more common in the women with urinary incontinence weekly or more often compared with those with incontinence more seldom.

Of the 500 (47%) women with any fecal incontinence at any time, 24% reported social limitations because of the incontinence: 97 (19%) refrained from walking for exercise, 16 (3%) from exercising at all, 12 (2%) from work or education, 16 (3%) from unspecified activities, and seven (1%) from sex. All 105 women with any incontinence of solid stools reported social limitations.

The distribution of the answers about symptoms of genital prolapse in the questionnaire is shown in Table V. Twenty-five percent of all women reported at least one of the chosen symptoms of genital prolapse. Pelvic heaviness was experienced significantly more often by the 40-year-old women compared with the 60-year-olds, whereas digitation by defecation was used significantly more often by the 60-year-olds compared with the 40-year-old women. Feelings of pelvic heaviness had no significant association with the body mass index in either age group (data not shown). Only six women in each age group (1%) reported all three chosen symptoms suggestive of genital prolapse.

Table IV. Urinary leakage: individual questions and answers adapted from the Kauppila detrusor instability score

	40-year-olds	60-year-olds
Urge to void before leakage ($n=589$)		
No	68%	61%
Sometimes	27%	29%
Mostly	5%	10%
Amount of leakage ($n=639$)		
A few drops	69%	58%
A splash	25%	25%
Bladder empties	6%	17%
Leakage when straining ($n=489$)		
Yes	29%	21%
Sometimes	54%	64%
Also without straining	2%	5%
Leakage at once after straining ($n=519$)		
Yes	14%	15%
Sometimes	84%	80%
Urinary tract infection last two years ($n=630$)		
No	98%	95%
1–2	2%	5%
Almost always	–	–

n = number of answers to the question.
Results are given as percentages of 40- and 60-year-old incontinent women.

Discussion

The response rate in the present study is similar to that of other epidemiological questionnaire studies (12).

The validation of the questionnaire showed acceptable results except for the questions about flatus incontinence. The telephone interviews for reproducibility testing showed that several women had considered any passing of flatus to be incontinence. They changed their answers when learning that this is a physiological mechanism, although socially unacceptable in most contexts. We consider the fact that the reproducibility for the individuals was low to be a reflection of the elusiveness of the condition rather than of methodological errors. The high overall prevalence and low individual reproducibility rates give an important background for future research on flatus incontinence.

In the sample of the nonresponders analyzed, the urinary incontinence rate was similar to that among the responders. The outcomes of the response rate, nonresponder analysis, and validation procedures altogether were considered satisfactory, and the study group was assumed to be representative of the population.

Medication for an overactive bladder was used by a few women only (0.5%), but it might be of

Table V. Distribution of the answers to the questions concerning symptoms of genital prolapse in 40-year-old and 60-year-old women

Study population	Pelvic heaviness	Genital bulge	Digitation by defecation	Any of the three symptoms
40-year-old ($n=641$)	17%	4%	10%	23%
60-year-old ($n=663$)	12%	4%	14%	28%

$n=$ number of answers to the question.

value to many more women with signs of detrusor instability, i.e. those with high DIS.

The ICS has defined urinary incontinence as an involuntary loss of urine that is objectively demonstrable and a social or hygienic problem (13). The ICS definition is unpractical for use in large population studies. Perceptions of social and hygienic bother is individual. Objectively demonstrable leakage is technically difficult to establish in epidemiological research.

Urinary incontinence is a common symptom in women. Approximately, only half of the female population consider themselves to be continent (Table I). It seems that some urinary incontinence might be considered a normal reaction to excessive exercise, coughing or bladder filling. One dilemma is to determine what criteria are needed to make a disease (disturbance in a physiologic process) bothersome enough to be considered an illness (subjective suffering for the individual).

The epidemiological study by Elving *et al.* in 1989 reported that 26% of women had ever experienced urinary incontinence and 14% perceived it to be a social or hygiene problem (14). In our study, more women (49%) (Table I) had any incontinence and 20% reported any social limitations. Elving *et al.* claimed that they used the ICS definition of urinary incontinence but did not state how incontinence was objectively demonstrated or how often leakages occurred. Other studies state prevalence figures of urinary incontinence between 10% and 30% in age groups similar to those in the present study, but the frequency of incontinence is seldom discussed (1,12). The question of bother is so dependent on the social context of the woman that it is doubtful whether it can be considered part of the definition for epidemiological research. Incontinence weekly or more often was found by Møller *et al.* (15) to be the single most appropriate measure of lower urinary tract symptoms in perimenopausal women.

Comparison of prevalence figures for urinary incontinence between populations and meta-analyses would be easier to perform if the incontinence concept was operationalized for epidemiological use, as suggested by Hampel *et al.* (1). Sandvik *et al.* (16) suggested a promising scoring system but translation and revalidation would be needed for use in other countries. We suggest stating urinary incontinence weekly or more often to be bothersome enough to be considered an illness in studies concerning prevalence. This approach is supported by the work of Møller *et al.* (15)

The DIS described by Kauppila *et al.* (10) was originally developed for evaluation of detrusor instability before incontinence surgery and has not been validated for epidemiological use. We used the DIS questions as a model for differentiating stress- from urge-incontinence, and our findings (Tables III and IV) correspond to those of other authors (2,17). Detrusor instability signs seem to occur more often in the older age group. Factors other than lack of estrogen in association with aging need to be investigated in order to establish the etiology of urge incontinence. Patient history of urinary tract infection was uncommon in our material, and this question is hence of doubtful value when using DIS in epidemiological research.

The type of fecal incontinence was separated into three groups as shown in Table II. Flatus incontinence was very common in our study. Although reproducibility was poor, this is an important finding because flatus incontinence is often used as an endpoint in research about anal sphincter muscle damage and repair in obstetrics. Either some flatus incontinence must be considered normal or the concept has to be defined very distinctly to be useful in research. Incontinence of loose and solid feces are clearer concepts than both urinary and fecal incontinence, and our prevalence figures are consistent with those of other studies (18,19).

Drossman *et al.* reported from a study of functional gastrointestinal disorders that prevalence for gross fecal incontinence in women is 0.9% (12). This corresponds to our figures of approximately 1% for incontinence of solid feces, but incontinence of liquid feces was more common in our population (Table II) than in the study by Drossman (12). Asking how often leakage occurs may invite more nuances in symptoms than binominal 'yes or no' alternatives.

Genital prolapse symptoms vary among patients and there is no specific symptom that is

present in all patients. Apart from the symptoms chosen for this study, sexual bother and problems with continence are other common but nonspecific symptoms of genital prolapse (20). Genital bulge seems to be the symptom showing the best comparability with the figures of prevalence of genital prolapse documented by other authors (Table V) (7,8,21). Samuelsson's group found any prolapse sign in 30.8% of examined women in their study, but the subjective symptom was not specified (22). Pelvic heaviness was unexpectedly common in our group of 40-year-olds and may be influenced by other conditions such as premenstrual pelvic congestion or uterine fibroids. For epidemiological use, prolapse-symptoms to ask for need to be specific and clear-cut like genital bulge and habitual digitation. Validation by clinical examination was not performed in our study. This might be the next step in a scientific evaluation in order to establish the correlation between symptoms and signs of genital prolapse in epidemiology.

Patients with rectocele often report digitation by defecation when asked. The 14% prevalence rate of this technique in this general population was surprisingly high. The hygienic bother of needing to use the fingers when defecating is easy to imagine. It would have been appropriate to relate bowel habits to this symptom but we did not ask this in our study. The inability to empty the rectum may worsen with malfunction of the neuromuscular integrity of the anterior rectal wall. Whether the impaction causes the rectocele or vice versa is not known. The defecation habits of women as well as incomplete repair of obstetric tears are areas to investigate in the etiology of rectocele.

Conclusion

Incontinence of urine and flatus commonly occurs in 40- and 60-year-old women, and prevalence increases with age. The ICS definition of urinary incontinence is unpractical for use in epidemiological research. An operationalized concept for clinically significant urinary incontinence such as leakage weekly or more often could be of benefit in order to compare the prevalence figures between epidemiological studies. For genital prolapse, genital bulge and defecation by digitation seem to be useful symptoms that should be validated by clinical examinations in future studies.

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