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Female Urology - Incontinence

Urinary Incontinence in French Women: Prevalence, Risk Factors, and Impact on Quality of Life

Andrea Lasserre^{a,b,*}, Camille Pelat^{a,b}, Violaine Guérout^{a,b}, Thomas Hanslik^{a,b}, Emmanuel Chartier-Kastler^{c,d}, Thierry Blanchon^{a,b}, Calin Ciofu^e, Emmanuel D. Montefiore^f, Fabián P. Alvarez^{a,b}, Juliette Bloch^g

^aINSERM, U707, F-75012, Paris, France

^bUPMC Université Paris 06, UMR-S U707, F-75012, Paris, France

^cAssociation Française d'Urologie (AFU), General Secretary (2004–2007), F-75011, Paris, France

^dAP-HP, Groupe Hospitalier Pitié-Salpêtrière, Service d'Urologie, Faculté de Médecine Pierre et Marie Curie, UPMC University Paris 06, F-75013, Paris, France

^eAP-HP, Hôpital Tenon, Service d'Urologie, F-75020, Paris, France

^fAP-HP, Hôpital Tenon, Service Gynécologie et Obstétrique, F-75020, Paris, France

^gInstitut de Veille Sanitaire, F-94415, Saint-Maurice, France

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Abstract

Background: The lack of epidemiologic data on the prevalence of female urinary incontinence (UI) attending general practitioners (GPs) in France led us to conduct a cross-sectional study in our country.

Objectives: To determine the prevalence of UI and to assess its impact on the quality of life (QoL).
Design, setting, and participants: This cross-sectional study of women aged >18 yr was conducted by attending GPs between June 2007 and July 2007.

Measurements: The main outcome measures were urinary symptoms, functional impairment, International Consultation on Incontinence Questionnaire–Short Form score, and medical care seeking.

Results and limitations: Overall, 241 GPs enrolled 2183 women seen during 1 d. The prevalence of UI was 26.8% ($n = 584$) and increased with age, body mass index (BMI), and number of children delivered ($p < 0.0001$). Among women with UI, 496 were included in a cross-sectional survey: 45.2% ($n = 224$) had stress UI, 42.1% ($n = 209$) had mixed UI, and 10.9% ($n = 53$) had urge UI, while 2% ($n = 10$) had UI of indeterminate type. Overall, 288 of 496 women (51.8%) stated that UI had a negative impact on their QoL; this effect remained mostly mild or moderate, and only 197 of 496 women (39.7%) had asked for medical help. Longer duration of symptoms, higher frequency of comorbid urinary symptoms, and altered QoL were most frequent among women with mixed UI ($p < 0.001$). Misclassification may have occurred because the diagnosis of UI was based on self-reported data rather than on clinical or urodynamic examinations.

Conclusions: UI symptoms were found in almost one in four women attending GPs. Clinical and functional UI impairment were associated with age, BMI, and parity. UI caused distress to women, but only those who were severely affected sought help. The results emphasize the need for policy development for UI prevention and management in France.

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* Corresponding author. Réseau Sentinelles, UMR S 707, Faculté de Médecine Pierre et Marie Curie, site Saint Antoine, 27 rue Chaligny, 75571 Paris Cedex 12, France. Tel. +33 1 44 73 84 61; Fax: +33 1 44 73 84 54.
E-mail address: lasserre@u707.jussieu.fr (A. Lasserre).

1. Introduction

Urinary incontinence (UI) has been defined as the complaint of any involuntary leakage of urine [1]. This condition can have a personal and an economic impact on women [2].

The prevalence of UI in women ranges from 10% to 60%, depending on the populations studied [3–9]. Prevalence estimates for UI among women in France ranged from 20% to 47% [6,10,11]. Thus, 47% prevalence in France was reported by a cross-sectional study conducted in 14 European countries where specialists' care was overrepresented [10]. A 44% UI prevalence rate was found in France by a European postal survey sent to community-dwelling women aged >18 yr in five countries [6]. In another French study, 20% prevalence of UI was found in community-dwelling women aged >18 yr who were contacted by phone [11]. The differences in UI prevalence may be explained by factors such as differing definitions of UI, study sample, and survey procedure variations.

In 2004, a new public health law was enforced [12]. The law stated that it was of paramount importance to study the prevalence and quality of life (QoL) of subjects with UI and to provide guidelines for primary health care professionals to detect early symptoms of UI. The general practitioner (GP) is the first contact and plays an important role as gatekeeper into the health system. Indeed, since 2005, all subjects in France have had to go to a GP before being referred to health specialists including urologists.

In France, the exact number of women with UI who attend GPs is not known. The lack of these data led us to conduct a cross-sectional study of women seeing GPs in our country. The aims of the present study were (1) to determine the prevalence of UI in women attending GPs; (2) to analyze risk factors associated with UI; (3) to describe the characteristics of UI in these women; (4) to describe the types, severity, and duration of UI; and (5) to assess the impact of UI on the QoL of women.

2. Materials and methods

2.1. Study design

This cross-sectional study was conducted among women attending GPs in France. The participating GPs belong to the "Sentinelles" network, a computerized disease-surveillance system with about 1292 volunteer GPs located throughout mainland France [13]. GPs belonging to the Sentinelles network represent 2% of all mainland GPs. The study was conducted between June 2007 and July 2007.

2.2. Participants

All of the Sentinelles GPs were sent a letter asking them to enroll all consecutive ambulatory women aged >18 yr, who constituted our *study register*. For each woman included in this study register, data were collected on age, number of children delivered, weight, and height. A woman was defined as having UI symptoms if she responded "yes" to the following question: "Did you experience any urine leakage at least once during the past four weeks?" Women answering "yes" were offered the opportunity to participate in a cross-sectional study if they were not pregnant and had not given birth during the previous 3 mo.

The characteristics of the study sample were compared with those of women attending a GP in France (ie, age) and with those of the French population (ie, age, parity, and body mass index [BMI]) to assess the representativeness of the study sample [14,15].

Using standard formulas [16], it was found that the inclusion of approximately 1600 women would allow for a precision of plus or minus 2.5% with respect to prevalence, regardless of the actual prevalence. For convenience, GPs were asked to include women for a whole day. With 241 GPs recruited, seven women per day per GP was needed. According to the experience of our GP network, this number was easily reached.

The sampling method ensured that the women who participated composed a representative cross-section of women of the ages studied attending GPs, thus avoiding a selection bias.

2.3. Data collection

Data for all patients included in the cross-sectional study were gathered using a questionnaire that consisted of three parts. The first part was completed with the GPs during the medical visit, and the last two parts were completed by patients through self-reported questionnaires.

The first part was designed to investigate the woman's demographic characteristics and obstetric history: age, weight, height, number of pregnancies, age at last delivery, duration of UI, whether or not she had consulted a physician in relation to her UI, the type of medication received to treat the UI (if any), and the potential medical origin of the UI (eg, diabetes mellitus, previous abdominal surgery, chronic diseases).

The second part was designed to determine the frequency and severity of UI and its impact on women's QoL. The International Consultation on Incontinence Questionnaire–Short Form (ICIQ-SF) is a brief, specific questionnaire developed under the auspices of the International Continence Society (ICS) [17]. It consists of three items: (1) frequency of UI (never, once a week, two or three times a week, once a day, a few times a day, always); (2) volume (none, small amount, moderate amount, large amount); and (3) how much urine leakage affects your daily life (0: "not at all"; 1–3: "mildly"; 4–6: "moderately"; 7–9: "severely"; 10: "to a great extent"). From the sum of these three items, the total ICIQ-SF score (between 0 and 21) was calculated. A fourth item included eight questions related to the symptoms to determine the type of UI.

The third part of the study questionnaire was designed to describe the kinds of activities that were affected by urinary leakage: daily activities (eg, shopping, excursions outside home, driving a car, climbing up or down stairs, interruption of work), sexuality (eg, anxiety while having sex, sexual behavior, fear of urinating when having sex), and the need to wear a pad or protective clothing (eg, never, once a day, once a week, once a month, rarely).

2.4. Definitions

The ICS defines UI as "any leakage or involuntary loss of urine." Urge UI is the complaint of involuntary leakage accompanied by or immediately preceded by urgency. Stress UI is the complaint of involuntary leakage on effort, exertion, sneezing, or coughing. Mixed UI is the complaint of involuntary leakage associated with urgency as well as with exertion, effort, sneezing, or coughing [1].

2.5. Data analysis and statistical methods

Prevalence of UI was estimated as the ratio of the number of women who answered "yes" to the screening question to the total number of women in the study register. Analyses were carried out with R software (www.r-project.org). Statistical analyses included descriptive analysis, comparison tests, and bivariate and multivariate analyses. Comparisons of frequencies were carried out using chi-square tests; comparisons of

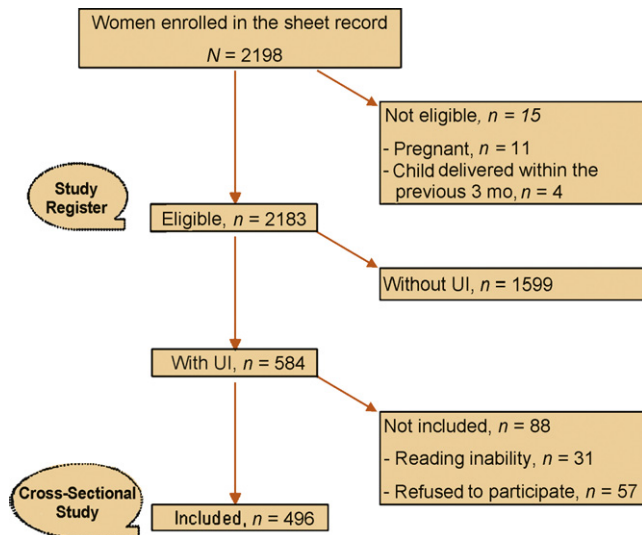


Fig. 1 – Flow diagram of women included in the analysis.

means were carried out using the student *t* test or analysis of variance (ANOVA). Logistic regression models were used to determine risk factors related to UI. Variables that were significantly related to UI in the univariate model were included in the multivariate model. The multivariate model allowed the risks obtained for each factor to be adjusted for the other factors. Statistical significance was set at the 5% level ($p < 0.05$).

3. Results

Between June 2007 and July 2007, some 2183 consecutive patients were eligible for recruitment by 241 GPs (Fig. 1). Among these patients, 584 confirmed that they had experienced UI during the previous 4 wk, and 496 agreed to participate in the cross-sectional study. Some 31 patients were not able to answer the questionnaire, and 57 declined to participate (Fig. 1).

3.1. Characteristics of the women in the study register

The women in the sample had a mean age of 55 yr, had delivered a mean number of two children, and had a mean BMI of 23.8 kg/m². The women in the general population (>18 yr) had a mean age of 49 yr, a mean number of two children delivered, and a mean BMI of 25 kg/m². Incontinent women were older (60.5 yr vs 51.7 yr, $p < 0.001$), had a higher BMI (26.7 kg/m² vs 24.9 kg/m², $p < 0.001$), and had more children than continent women (2.3 vs 1.7, $p < 0.001$) (Table 1).

3.2. Prevalence of urinary incontinence

The overall prevalence of UI was 26.8% (584 of 2183 women; 95% confidence interval [CI]: 24.9–28.6). It increased with age, BMI, and number of children delivered (Table 2). In the final logistic regression model, age >50 yr (odds ratio [OR]: 1.7; 95% CI: 1.3–2.1), BMI >25 kg/m²

Table 1 – Comparison of women with and without urinary incontinence (UI)

	UI		<i>p</i> [*]
	Yes <i>n</i> = 584	No <i>n</i> = 1599	
Age, yr, mean ± SD	60.5 ± 17.3	51.7 ± 19.2	<0.001
DM, <i>n</i>	2	2	–
Weight, kg, mean ± SD	69.8 ± 15.3	65.2 ± 13.5	<0.001
DM, <i>n</i>	20	22	–
Height, cm, mean ± SD	161.5 ± 6.5	161.6 ± 6.7	NS
DM, <i>n</i>	21	38	–
BMI, kg/m ² , mean ± SD	26.7 ± 5.8	24.9 ± 5.1	<0.001
DM, <i>n</i>	21	60	–
No. of children delivered, mean ± SD	2.3 ± 1.6	1.7 ± 1.6	<0.001
DM, <i>n</i>	5	25	–

BMI = body mass index; DM = data missing; NS = not significant.
* Student *t* test.

Table 2 – Prevalence of urinary incontinence according to clinical characteristics

	<i>n</i>	Prevalence %, [95% CI]	Odds ratio [95% CI]
Age, yr			
<29	277	5.3 [4.0–9.9]	1
30–39	300	16.5 [14.9–23.7]	3.6 [1.8–5.5] [†]
40–49	341	21.9 [17.6–26.4]	4.9 [2.2–6.4] [†]
50–59	394	30.4 [26.1–35.2]	7.6 [3.6–9.8] [†]
60–69	330	34.5 [29.4–39.7]	9.2 [4.2–11.8] [†]
70–79	332	34.0 [28.9–39.1]	9.1 [4.2–11.5] [†]
≥80	206	46.6 [39.8–53.4]	15.2 [6.9–19.9] [†]
Body mass index, kg/m ²			
<25	1184	21.3 [17.8–23.7]	1
25–30	574	31.3 [25.6–34.5]	1.7 [1.4–2.2] [†]
≥30	375	37.4 [35.5–41.1]	2.4 [2.1–3.5] [†]
No. of children delivered			
0	452	12.9 [9.9–16.1]	1
1	432	24.5 [20.5–28.5]	2.2 [1.9–2.9] [†]
2	685	30.3 [26.8–33.7]	3.0 [2.2–3.9] [†]
3+	583	37.1 [29.5–39.4]	4.1 [2.7–4.2] [†]

CI = confidence interval.
* $p < 0.001$.

(OR: 1.7; 95% CI: 1.4–2.2), and a mean of two children delivered (OR: 1.5; 95% CI: 1.1–1.9) were associated with increased odds of having UI.

3.3. Characteristics of women reporting urinary incontinence symptoms

The characteristics of UI were evaluated in 496 women included in the cross-sectional study (Fig. 1). The type of UI was determined for 486 women, while 10 women could not be classified due to missing data. The distribution of urge UI, stress UI, and mixed UI was 10.9% ($n = 53$), 45.2% ($n = 224$), and 42.1% ($n = 209$), respectively. Stress UI was predominant for women aged <70 yr, while mixed UI was predominant in women >70 yr ($p < 0.001$) (Fig. 2). Women with mixed UI were older ($p < 0.001$) and had slightly higher BMIs than women with stress UI or urge UI (Table 3). Frequency, duration, and amount of leakage are presented

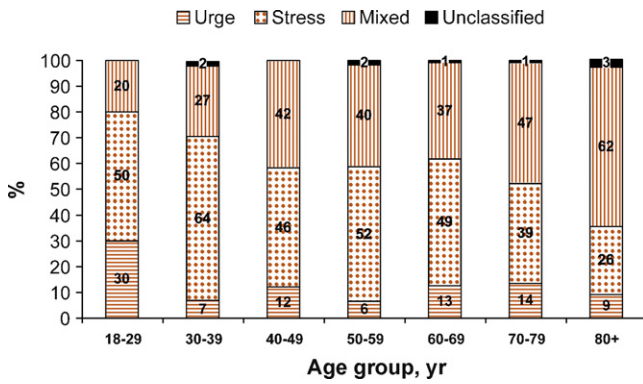


Fig. 2 – Distribution of urinary incontinence types in women according to age.

Table 4 – Adjusted odds ratio (OR) for frequency (more than once per day)

	OR	95% CI
Duration of UI symptoms*	1.88	[1.45–2.31]
Volume†	11.79	[9.72–13.86]
UI subtype (reference UUI)		
MUI	1.07	[0.89–1.29]
SUI	0.92	[0.80–1.06]
Nocturnal incontinence‡	1.1	[0.72–2.20]

CI = confidence interval; UI = urinary incontinence; UUI = urge UI; MUI = mixed UI; SUI = stress UI.
 * Duration of >5 yr for UI symptoms: yes/no.
 † Three categories: small/moderate/large.
 ‡ Two categories: yes/no.

in Table 3. Overall, 206 women (42.1%) reported experiencing urinary leakage once per day or more frequently, while 283 (57.9%) experienced it once or twice per week. Overall, UI had lasted for < 5 yr in 57.6% of the cases, and the amount of leakage was qualified as small in 78.7% of cases. These variables depended on the type of UI. Women with mixed UI had more frequent ($p < 0.001$) and more abundant ($p < 0.001$) leakage than women with stress and urge UI. Nocturnal incontinence episodes and abdominal surgery were most frequent in women with mixed UI ($p < 0.001$). Longer duration of UI symptoms (>5 yr) (OR: 1.88; 95% CI: 1.45–2.31) and large volume (OR: 11.79; 95% CI: 9.72–13.86) were significantly associated with women having UI episodes more than once per day, adjusted for the type of UI and the nocturnal incontinence episodes (Table 4).

3.4. Impact on quality of life and social complaints due to urinary incontinence

In answer to the question (ICQ-SF), “How much does urinary leakage affect your daily life?” 455 women (92.1%) responded that UI had negative impact on their QoL (Table 5); however, this bothersome effect remained mostly at the mild or moderate level, except for the women with mixed UI. The mean ICIQ-SF scores for urge UI, stress UI, and mixed UI were 7.0 ± 1.5 (4–9), 7.3 ± 3.1 (4–10), and 11.0 ± 4.9 (7–21), respectively. The difference was found to be significant for mixed UI compared with other types of UI ($p < 0.001$).

Social complaints are shown in Table 5. Among these women, 288 (58.1%) presented at least one complaint regarding their social lives, in which negative effects on excursions outside the home and on shopping were the most frequent. Work performances were disturbed for

Table 3 – Frequency, duration, and amount of leakage in women with urinary incontinence

Characteristic	All N = 496	Urge n = 53	Stress n = 224	Mixed n = 209	p
Age, yr, mean ± SD	61.2 ± 16.0	62.1 ± 17.1	58.2 ± 15.3	65.2 ± 16.3	<0.001*
BMI, kg/m ² , mean ± SD	26.8 ± 6.0	26.1 ± 5.8	26.2 ± 6.1	27.4 ± 6.2	0.065*
Children delivered mean ± SD	2.4 ± 1.6	2.2 ± 1.4	2.3 ± 1.4	2.2 ± 1.3	0.325*
Frequency of leakage, n = 489					
Once per week, n (%)	174 (35.6)	25 (47.2)	104 (46.4)	42 (20.1)	<0.001†
Twice or three times per week, n (%)	109 (22.3)	10 (18.9)	58 (25.9)	41 (19.6)	
Once per day, n (%)	86 (17.6)	9 (16.9)	38 (17.0)	38 (18.2)	
A few times per day, n (%)	87 (17.8)	5 (9.4)	18 (8.0)	63 (30.1)	
Always, n (%)	33 (6.7)	1 (1.9)	1 (0.5)	24 (11.5)	
Duration, n = 490					
<5 yr, n (%)	282 (57.6)	38 (71.7)	138 (61.6)	104 (49.7)	0.015†
5–10 yr, n (%)	113 (23.0)	11 (20.8)	71 (31.7)	83 (39.7)	
>10 yr, n (%)	95 (19.4)	3 (5.7)	12 (5.3)	22 (10.5)	
Amount of leakage, n = 494					
Small, n (%)	389 (78.7)	40 (75.5)	205 (91.5)	138 (66.0)	<0.001†
Moderate, n (%)	73 (14.8)	7 (13.2)	14 (6.3)	53 (25.4)	
Large, n (%)	32 (6.5)	3 (5.7)	1 (0.5)	17 (8.1)	
Nocturnal incontinence episodes, n = 473					
Frequently/sometimes, n (%)	64 (13.5)	9 (16.9)	6 (2.7)	47 (22.5)	<0.001†
Never/rarely, n (%)	409 (86.5)	36 (67.9)	189 (84.3)	122 (58.4)	

* Analysis of variance.

† Chi-square or Fisher exact test.

Table 5 – Social complaints due to urinary incontinence and impact on quality of life for the women affected

	All n (%)	Urge n (%)	Stress n (%)	Mixed n (%)	p [†]
Daily activities complaints					
Affects excursions outside home	311 (66.1)	25 (5.3)	131 (27.9)	150 (31.9)	<0.001
Affects driving a car	113 (24.0)	11 (2.3)	26 (5.5)	73 (15.5)	
Affects climbing up or down stairs	156 (33.2)	9 (1.9)	46 (9.8)	98 (20.9)	
Affects shopping	220 (46.8)	19 (4.0)	82 (17.5)	115 (24.4)	
Causes interruption of work or activities	179 (38.1)	18 (3.8)	48 (10.2)	109 (23.2)	
Sexuality complaints					
Anxiety thinking about having sex	59 (12.5)	4 (0.3)	27 (5.7)	27 (5.7)	<0.01
Affects sexual behavior	41 (8.7)	2 (0.4)	13 (2.8)	25 (5.3)	
Afraid to urinate when having sex	196 (41.7)	22 (4.7)	57 (12.1)	112 (23.8)	
At least one complaint from above	288 (61.3)	22 (4.7)	84 (17.9)	106 (22.5)	
ICIQ-SF score, n = 494					
0: not at all	39 (7.9)	8 (1.6)	19 (3.8)	11 (2.2)	<0.001
1–3: mild	199 (40.3)	30 (60.7)	106 (21.5)	57 (11.5)	
4–6: moderate	156 (31.6)	10 (2.0)	72 (14.6)	74 (14.9)	
7–9: severe	76 (15.4)	4 (0.8)	20 (4.0)	50 (10.1)	
10: great extent	24 (4.8)	1 (0.2)	6 (1.2)	17 (3.4)	
ICIQ-SF = International Consultation on Incontinence Questionnaire–Short Form.					
† Chi-square or Fisher exact test.					

38.1% of women who interrupted their work or home activities.

3.5. Seeking medical assistance and treatment

A large majority of women with UI (60.3%) had never reported their symptoms to a physician (Table 6). Those who consulted a physician ($n = 197$) were most likely to appeal to a GP (53.3%), followed by a gynecologist (37.0%), and lastly a urologist (23.9%). Gynecologists were principally consulted by women with mixed UI and stress UI, while urologists were more frequently seen by mixed UI women.

Among the women who consulted a physician, pelvic floor muscle training was the most frequently prescribed therapy, especially for women with stress UI (24.9%) and mixed UI (22.8%), compared with only 3.6% of women with urge UI ($p < 0.001$). Surgery and medication were more often proposed to women with mixed UI. Almost one in every two women required the daily use of a pad, while one in every four women had never used one. Pads were used more often by women with mixed UI compared to those with stress or urge UI ($p < 0.001$).

An ICIQ-SF score >10 (OR: 3.52; 95% CI: 1.94–6.41), ICIQ-SF score >16 (OR: 5.61; 95% CI: 2.31–13.63), and

Table 6 – Treatment-seeking behavior of women with urge, stress, and mixed urinary incontinence (UI) symptoms

		All n (%)	Urge n (%)	Stress n (%)	Mixed n (%)	p [*]
Seeking/sought medical assistance for UI, n = 496						
	Yes	197 (39.7)	19 (35.8)	81 (36.2)	92 (44.0)	0.31
	No	299 (60.3)	34 (64.2)	143 (63.8)	117 (55.9)	
General practice[†]						
	Yes	105 (21.2)	10 (18.9)	43 (19.2)	52 (24.9)	0.46
	No	391 (77.8)	43 (81.1)	181 (80.8)	157 (75.1)	
Gynecologist[†]						
	Yes	73 (14.7)	5 (9.4)	32 (14.3)	36 (17.2)	0.28
	No	423 (85.3)	48 (90.6)	192 (85.7)	173 (82.8)	
Urologist[†]						
	Yes	47 (9.5)	5 (9.4)	11 (4.9)	31 (14.8)	0.005
	No	449 (90.5)	48 (90.6)	213 (95.1)	178 (85.2)	
Seeking/sought treatment for UI, n = 197						
Pelvic floor muscle training[†]						
	Yes	103 (52.3)	7 (36.8)	49 (60.5)	45 (48.9)	0.01
	No	94 (47.7)	12 (63.1)	32 (39.5)	47 (51.1)	
Surgery[†]						
	Yes	43 (21.8)	4 (21.1)	10 (12.3)	27 (29.3)	0.19
	No	154 (78.2)	15 (78.9)	71 (87.6)	65 (70.7)	
Medication[†]						
	Yes	61 (30.9)	8 (42.1)	17 (20.9)	35 (38.0)	0.032
	No	136 (59.1)	11 (57.9)	64 (79.0)	57 (61.9)	
Requirement of wearing a pad or protective clothing, n = 437						
	Always	211 (48.3)	18 (38.3)	73 (37.1)	119 (64.7)	<0.001
	Once a week	20 (4.6)	2 (4.2)	7 (3.6)	11 (5.9)	
	Once a month	5 (1.1)	0 (0)	2 (1.0)	3 (1.6)	
	Rarely	82 (18.8)	5 (10.6)	54 (27.4)	23 (12.5)	
	Never	119 (27.3)	22 (46.8)	61 (30.9)	33 (17.9)	
	Data missing	59	6	27	20	
† Several possible responses.						
* Chi-square or Fisher exact test.						

Table 7 – Adjusted odds ratio (OR) for seeking medical assistance

	OR	95% CI
ICIQ-SF (reference ICIQ \leq 10)	–	–
ICIQ-SF 11–15	3.52	1.94–6.41
ICIQ-SF 16–21	5.61	2.31–13.63
Interruption of activities ⁺	1.38	1.08–1.75
Age [‡]	0.95	0.84–1.07
Nocturnal incontinence ⁺	1.24	0.98–1.57

CI = confidence interval; ICIQ-SF = International Consultation on Incontinence Questionnaire–Short Form.
⁺ Two categories: yes/no.
[‡] For every 10 yr.

interruption of activities due to urinary leakage (OR: 1.38; 95% CI: 1.08–1.75) were significantly associated with “seeking medical assistance” in the final model adjusted for age (Table 7).

4. Discussion

The present cross-sectional study conducted by GPs assessed the prevalence and impact on QoL of UI in French women >18 yr. Overall, 26.8% experienced UI at least once per month. The rate of UI increased with age, BMI, and number of children delivered. Stress incontinence was the predominant form of UI, followed by mixed UI and urge UI. More than half of the women complained that their UI had a negative impact on QoL; however, this was only mild to moderate in the majority, and only 40% of women sought medical help for their condition.

The prevalence of UI found by our study is in agreement with previous French studies that reported rates from 17% to 28% in the 1990s among women attending GPs [18,19]. In the present study, the rate of UI increased with age, BMI, and number of children delivered. Indeed, age >50 yr, delivery of more than two children, and BMI >25 kg/m² were the most predictive factors. These risk factors confirm those described in the literature [3–6,10,11,18,19].

In our sample, stress incontinence was the predominant form of UI, followed by mixed UI and urge UI. Stress UI was predominant before 70 yr of age, while mixed UI was principally found in women >70 yr. The highest rate of stress UI symptoms was found in women aged 30–39 yr (62%). In contrast, other studies of French women showed rates of stress UI prevalence that ranged from 3% in subjects aged <25 yr to 23.5% in subjects aged >40 yr [19]. Frequency, duration, and amount of leakage were found to be different according to the type of UI by bivariate analysis. Thus, women with mixed UI had more frequent and more abundant leakage, including nocturnal incontinence episodes, than women with stress and urge UI; however, no difference was found when the results were adjusted for age.

To our knowledge, this study is the first to use the validated ICIQ-SF for French women with UI who attend GPs. The influence of UI symptoms on the perception of QoL varied according to the severity of symptoms and impairment reported by the subjects. Overall, a negative impact of

UI was widely reported in this sample, where the highest mean ICIQ-SF score was reported for women with mixed UI. In the present study, urge UI and stress UI seem to have equivalent effects, and only mixed UI has a larger impact on QoL. Because women with mixed UI were the oldest, other etiological mechanisms such as neurological impairment or comorbidities affecting the control of bladder function could be involved. This point deserves future attention.

Daily activities that were usually affected were shopping, excursions outside home, and work performance; however, the effect on QoL seems to be mild to moderate. Similar results were reported in the Prospective Urinary Incontinence Research (PURE) study [20]. These results may indicate that strategies for coping with UI become part of everyday life; for example, women may acquire the habit of emptying the bladder before leaving home, even without having the feeling of a full bladder [21]. As shown in the present study, the use of protective clothing may be sufficient to cope with the symptoms, especially for women who experience stress incontinence when they cough or sneeze. Other concomitant conditions probably affect the women in addition to or more than UI [22].

In the present study, less than half of the women had previously sought help. Worsened QoL, as evaluated by higher ICIQ-SF scores and interruptions of work or home activities, were predictors for seeking help. It was previously reported that many people worldwide have bladder-control problems but few seek treatment [23]. In our study, the GP was the practitioner most frequently consulted, followed by the gynecologist and the urologist. In France, where the GP is the gatekeeper into the health care system, these results are not surprising. Additionally, women referred to urologists are those with more severe UI symptoms like those of mixed UI. These observations are in agreement with those of previous epidemiologic studies [22,24–26]. Involvement in this study presented a great opportunity for GPs to question their patients for the first time (data not shown) and for women to open a dialogue concerning their symptoms. UI is a social taboo; most women suffer silently and have probably not been properly diagnosed [24–26]. The French Association of Urologists calls for action each year to place UI on the public health agenda and to facilitate access to patient-friendly information.

Several limitations of the present study should be considered. Even if the study sample is representative of the women visiting their GPs in France, an overrepresentation of women >60 yr was observed with respect to the general population. Women consulting their GPs may have an acute illness with a very short-term effect on UI; however, these conditions were not controlled in the present study. Some misclassification may have occurred because the diagnosis of UI was based only on self-reported data rather than on clinical or urodynamic examinations.

5. Conclusions

UI symptoms are frequent in women attending their GPs in France. Clinical severity and functional impairment depend

on the type of UI. Incontinence causes embarrassment, but only the most severely affected women seek help. The results emphasize the need for policy development for UI prevention and management in France.

Author contributions: Andrea Lasserre had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Study concept and design: Alvarez, Blanchon, Chartier-Kastler, Bloch, Ciofu, Montefiore.

Acquisition of data: Guéroult, Lasserre, Alvarez.

Analysis and interpretation of data: Lasserre, Alvarez, Pelat, Bloch, Chartier-Kastler, Hanslik.

Drafting of the manuscript: Lasserre, Bloch, Chartier-Kastler, Hanslik, Pelat, Blanchon.

Critical revision of the manuscript for important intellectual content: Lasserre, Bloch, Chartier-Kastler, Hanslik, Pelat.

Statistical analysis: Lasserre, Pelat, Hanslik.

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References

- [1] Abrams P, Cardozo L, Fall M, et al. The standardization of terminology in lower urinary tract function: report from the Standardisation Sub-Committee of the International Continence Society. *Urology* 2003;61:37–49.
- [2] Debruyne F, Heesakkers J. Clinical and socioeconomic relevance of overactive bladder. *Urology* 2004;63:42–4.
- [3] Kocak I, Okyay P, Dundar M, Erol H, Beser E. Female urinary incontinence in the west of Turkey: prevalence, risk factors and impact on quality of life. *Eur Urol* 2005;48:634–41.
- [4] Avellanet M, Cirea E, Coll M. Prevalence of urinary incontinence in Andorra: impact on women's health. *BMC Women's Health* 2003;3:5.
- [5] Hunskaar S, Burgio K, Diokno AC, Herzog AR, Hjälmås K, Lapitan MC. Epidemiology and natural history of urinary incontinence in women. *Urology* 2003;62:16–23.
- [6] Hunskaar S, Lose G, Sykes D, Voss S. The prevalence of urinary incontinence in women in four European countries. *BJU Int* 2004;93:324–30.
- [7] Hannestad YS, Rortveit G, Sandvik H, Hunskaar S. A community-based epidemiological survey of female urinary incontinence: the Norwegian EPINCONT study. *J Clin Epidemiol* 2000;53:1150–7.
- [8] Hampel C, Wiehold D, Benken N, Eggersmann C, Thüroff JW. Prevalence and natural history of female incontinence. *Euro Urol* 1997;32:3–12.
- [9] Vandoninck V, Bemelmans B, Mazzetta C, et al. The prevalence of urinary incontinence in community-dwelling married women: a matter of definition. *BJU Int* 2004;94:1291–5.
- [10] Sykes D, Castro R, Espuna Pons M, et al. Characteristics of female outpatients with urinary incontinence participating in a 6-mo observational study in 14 European countries. *Maturitas* 2005;52S:S13–23.
- [11] Gasquet I, Tcherny-Lessenot S, Gaudebout P, Bosio Le Goux B, Klein P, Haab F. Influence of the severity of stress urinary incontinence on quality of life, health care seeking, and treatment: a national cross-sectional survey. *Eur Urol* 2006;50:818–25.
- [12] Incontinence urinaire et troubles de la statique pelvienne chez la femme: réduire la fréquence et les conséquences de l'incontinence urinaire. *Loi Santé Publique* 2004, Article 78. <http://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000787078&dateTexte=>.
- [13] Fouquet F, Druker J. Communicable diseases surveillance: the Sentinel network. *Lancet* 1997;349:794–5.
- [14] Etude nationale nutrition santé (ENNS). Institut de Veille Sanitaire Web site. <http://www.invs.sante.fr/surveillance/nutrition/enns.htm>. Updated March 28, 2006.
- [15] Population [in French]. Institut National de Statistique et Etudes Economiques Web site. <http://www.insee.fr/fr/themes/theme.asp?theme=2>.
- [16] Lwanga SK, Lemeshow S. Sample size determination in health studies: a practical manual. Geneva, Switzerland: World Health Organization; 1991. p. 1–6.
- [17] Avery K, Donovan J, Peters TJ, Shaw C, Gotoh M, Abrams P. ICIQ: a brief and robust measure for evaluating the symptoms and impact of urinary incontinence. *NeuroUrol Urodyn* 2004;23:322–30.
- [18] Minaire P, Jacquetin B. The prevalence of female urinary incontinence in general practice. *J Gynecol Obstet Biol Reprod* 1992;21:731–8.
- [19] Peyrat L, Haillet O, Bruyere F, Boutin JM, Bertrand P, Lanson Y. Prevalence and risk factors of urinary incontinence in young and middle-aged women. *BJU Int* 2002;89:61–6.
- [20] Monz B, Chartier-Kastler E, Hampel C, et al. Patient characteristics associated with quality of life in European women seeking treatment for urinary incontinence: results from PURE. *Eur Urol* 2007;51:1073–82.
- [21] Chapple C. Classification of mixed incontinence. *Eur Urol Suppl* 2006;5:837–41.
- [22] O'Donnell M, Lose G, Sykes D, Voss S, Hunskaar S. Help-seeking behavior and associated factors among women with urinary incontinence in France, Germany, Spain and the United Kingdom. *Eur Urol* 2005;47:385–92.
- [23] Norton P, Brubaker L. Urinary incontinence in women. *Lancet* 2005;367:57–67.
- [24] Chartier-Kastler E. SUI: current management and unmet needs. *Eur Urol Suppl* 2005;4(1):11–7.
- [25] Minassian VA, Drutz HP, Al-Badr A. Urinary incontinence as a worldwide problem. *Int J Gynecol Obstet* 2003;82:327–38.
- [26] Hannestad YS, Rortveit G, Hunskaar S. Help-seeking and associated factors in female urinary incontinence. *Scand J Prim Health Care* 2002;20:102–7.