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INCIDENCE AND REMISSION OF URINARY INCONTINENCE AT MIDLIFE, AN 18 YEARS COHORT STUDY

Hypothesis / aims of study
Urinary incontinence is often considered as a degenerative disease that develops gradually with aging. Beside deliveries, few things are known about factors, which can promote its incidence or its remission. The aim of our study was to analyze factors related to the incidence and the remission of UI in a cohort of women aged from 47 to 52 years at baseline and followed for 3 to 18 years, while taking into account not only the factors traditionally studied (weight and obstetric history), but also social characteristics and physical and mental health.

Study design, materials and methods
We conducted a longitudinal cohort study of 4127 middle-aged women (aged 47 to 52 years at baseline). Urinary incontinence was defined as bladder control problems. The question was repeated every 3 years on an 18-year period (1990-2008). Two samples (remission and incidence of UI) were analyzed according to the state at baseline (continent or not). UI incidence and remission could be analyzed for 3828 women. The final sample for analysis of UI incidence included 2,887 women and that for UI remission, 941. A Cox model was used for the univariable analysis of predictive factors of incidence and remission. The multivariable analysis was conducted with a semi-parametric Cox model.

Results
The median follow-up was 12 years (range: 3 to 18 years). The annual incidence rate of urinary incontinence was 3.3% and the remission rate was 6.2%.
In the univariable analysis, a 1-kg weight gain in the year preceding the event, overweight, obesity, impaired QoL, and depression were significantly associated with UI incidence. Weight gain, hypertension, obesity and the deterioration of QoL (in its emotional and pain dimensions) were significantly associated with lower rates of UI remission. Factors significantly associated with an increased incidence of UI were parity (having no children appeared to "protect" against UI, and giving birth to at least two children seemed to increase UI incidence). A hysterectomy and reaching menopause during follow-up were also associated with UI incidence. Menopause was the only characteristic significantly associated with a lower rate of UI remission (i.e., meeting the definition of menopausal increased the risk of persistent UI).
In the multivariable analysis, the factors significantly associated with UI incidence were a higher educational level, weight gain, depressive symptoms, impaired QoL (in the energy and social isolation dimensions), multiparity, and menopause (Table1). The factors associated with a lower chance of UI remission were aging and overweight. Reaching menopause during follow-up was associated with a higher probability of UI remission (Table2).

Interpretation of results
UI is a dynamic and complex phenomenon, and longitudinal studies, with a relatively long follow-up, are necessary to characterize its risk factors accurately. The originality of this study is that it clarifies the factors related to UI incidence and remission in midlife women over a long follow-up period. Our study suggests that high school diploma, parity, menopause, weight gain, onset of depressive symptoms, and an alteration in health-related quality of life were associated with an increased probability of incidence of UI. The factors which were associated with persistent UI were aging and weight gain whereas the change of menopausal status was associated with a higher probability of remission of the UI.
Although parity and weight gain appear to maintain their leading roles in UI onset, the importance of newer factors, such as depression and impaired QoL, raise the possibility of new medical or behavioral therapies. In addition, women should be informed about the beneficial, effect of weight loss (even minimal) on remission, because it is the only modifiable factor that has been clearly identified. The role of menopause and HRT are more difficult to interpret. Embedding collection of information about the different types of UI into longitudinal studies would refine our results.

Concluding message
Our study suggests that, in our population of middle-aged women, onset of a depression and degradation in health-related quality of life may promote urinary incontinence and this observation opens the field of new medical or behavioral therapies.

Table 1 : Association between women's characteristics and incidence of urinary incontinence. Multivariate analysis.

Women's characteristics	HR	95 CI%	p
High school diploma	1.28*	[1.05 – 1.55]	0.01*
Marital status: Married, living as	1.11	[0.89 - 1.38]	0.37
Alcohol : Occasionally	1.18	[0.78 – 1.79]	0.65
Alcohol : Daily	1.11	[0.70 – 1.76]	
Weight	1.01*	[1.00 – 1.02]	0.01*
Major depression (CESD≥16)	1.31*	[1.09 - 1.57]	0.01*
NHP physical mobility >0	1.17	[0.98 - 1.41]	0.08
NHP social isolation >0	1.29*	[1.04-1.60]	0.02*
NHP emotional reaction>0	0.97	[0.79 – 1.20]	0.81
NHP pain >0	0.93	[0.77-1.11]	0.40

NHP sleep>0	0.93	[0.78-1.11]	0.42
NHP energy >0	1.41*	[1.17-1.70]	<0.01*
Nulliparity	0.61*	[0.44 - 0.84]	<0.01*
Menopause	5.44	[4.47– 6.63]	<0.01*
Hysterectomy	0.81	[0.66 – 1.01]	0.06

NHP: Nottingham Health Profile; CES-D Center for Epidemiologic Studies Depression Scale

Table 2 : Association between women's characteristics and remission of urinary incontinence. Multivariate analysis.

Women's characteristics	HR	95 CI %	p
Age	0.58	[0.55 – 0.61]	<0.0001*
Weight	0.99	[0.98 – 0.99]	0.03*
Major depression (CESD≥16)	1.03	[0.81-1.31]	0.75
NHP physical mobility >0	0.90	[0.69 - 1.17]	0.45
NHP social isolation >0	0.91	[0.68 – 1.22]	0.52
NHP emotional reaction >0	0.89	[0.68 – 1.17]	0.40
NHP pain >0	0.89	[0.69 - 1.15]	0.37
NHP energy >0	1.10	[0.85 - 1.42]	0.46
High school diploma	1.26	[0.97 – 1.64]	0.08
Urban place of residence	1.09	[0.83 - 1.44]	0.52
Regular physical exercise (>1/week)	0.86	[0.68 – 1.09]	0.22
High blood pressure	0.95	[0.72 -1.27]	0.74
Menopause	1.54	[1.19 – 1.99]	<0.01*

HRT: Hormone therapy for menopause; NHP: Nottingham Health Profile; CES-D Center for Epidemiologic Studies Depression Scale

Specify source of funding or grant	**None**
Is this a clinical trial?	**No**
What were the subjects in the study?	**HUMAN**
Was this study approved by an ethics committee?	**Yes**
Specify Name of Ethics Committee	**Comité Consultatif National Français d'Ethique pour les Sciences de la Vie et de la Santé.**
Was the Declaration of Helsinki followed?	**Yes**
Was informed consent obtained from the patients?	**Yes**