

## ARE SMOKING AND OTHER LIFESTYLE FACTORS ASSOCIATED WITH URINARY INCONTINENCE?

### Aims of Study

Epidemiological research has revealed several factors associated with urinary incontinence in women, the most commonly reported being age, pregnancy and childbirth. Risk factors that may be modifiable have not been investigated to the same extent. Inadequate control for confounding factors is a weakness of several studies and many have been performed in selected populations.

The aim of this large population based study was to evaluate the role of smoking and other modifiable lifestyle factors potentially associated with urinary incontinence in women.

### Methods

The EPINCONT study is part of a large survey performed in a county in Norway. 27936 women completed the incontinence part of the questionnaire. For the 6876 incontinent women (24,6%), a severity index was calculated based on the answers regarding frequency and amount of leakage, and the incontinence was categorised into slight, moderate and severe. The incontinence was also classified into three different subtypes; stress, urge and mixed incontinence. The participating women answered additional questions about many other topics, including smoking habits, the intake of alcohol, tea and coffee and amount of physical activity. Body mass index (BMI) was derived from the measurements of height and weight ( $\text{kg/m}^2$ ) at the screening station.

Proportions were used to describe the univariate relationship between urinary incontinence and the ordered variables. Where relevant, possible interaction and confounding was evaluated by stratified table analyses and logistic regression. Logistic regression analyses were used to adjust for confounding and establish the factors independently associated with the outcome, and odds ratios were the effect measure. Effects were denoted as strong when ORs were 1,8 or more, and weak when ORs were 1,2-1,7. In all logistic regression analyses, women with no incontinence served as the reference group. All analyses were performed separately for each of the different outcomes under investigation; any incontinence (all incontinent women), severe incontinence and the different subtypes.

### Results

The crude analyses showed that the prevalence of any urinary incontinence increased with increasing age and increasing BMI. Former smokers reported more frequently incontinence than current or never smokers. An increasing intake of tea and coffee seemed associated with a higher prevalence of incontinence, whereas the relationship was inverse for the intake of alcoholic beverages. The crude prevalences also suggested an association between physical activity and any incontinence. The prevalence of severe incontinence and the different subtypes of incontinence, varied in a pattern parallel to that for any incontinence, according to the factor in question.

The adjusted logistic regression analyses showed that neither former nor current smoking increased the odds for any incontinence compared with never smoking (former smoking: OR 1.1, 95% confidence interval 1.0-1.2, current smoking: 1.0 ( 0.9-1.0)), but a weak and significant association was present for severe incontinence (former smoking: 1.4 (1.2-1.6), current smoking: 1.4 (1.2-1.6)) . When smoking status was explored further based on number of cigarettes smoked, a dose-response relationship appeared (Table 1). There was no association between any incontinence and former or current smoking of less than twenty cigarettes a day, but an increased and significant odds ratio for both former and current smoking of twenty cigarettes or more daily. The effect was stronger for severe incontinence. For the different subtypes of incontinence, smoking status showed an weak and significant association only with mixed incontinence.

Increasing BMI was strongly associated with any urinary incontinence, with severe symptoms and with all subtypes (Table 1). An increasing amount of low intensity physical activity was related to slightly lowered odds for any incontinence, severe incontinence and both stress and mixed types incontinence. High intensity physical activity showed only weak and insignificant associations to either of the outcomes.

Daily tea-drinkers had raised risk for incontinence. The intake of tea was weakly associated with all three types although not significantly for urge type. Coffee had no effect on any incontinence and a weak but significant negative effect on severe incontinence and severe mixed type. The intake of alcohol showed no association with any of the outcomes under analyses.

## Conclusions

In this large, population-based study we investigated the association between several potentially modifiable lifestyle factors and urinary incontinence. We found that former and current smoking was associated with incontinence only for those who smoked more than twenty cigarettes per day. Severe incontinence was weakly associated with smoking regardless of number of cigarettes. The association between increasing BMI and incontinence was strong and present for all subtypes. Increasing amount of low intensity physical activity had a weak and negative association with incontinence. Tea-drinkers had raised risk for all types of incontinence. We found no important effects of high intensity activity, intake of alcohol or coffee.

This study was designed to describe associations, and accordingly we cannot conclude regarding causality. It remains for future research to establish whether modification of the associated lifestyle factors alters the prevalence of incontinence.

Table.1. Adjusted logistic regression analyses<sup>1</sup>

	OR	Any incontinence		Severe incontinence	
		OR	95% CI	OR	95% CI
No. of cigarettes/day					
0	1			1	
Former 1-19	1,1	1,0-1,2	1,3	1,1-1,5	
20+	1,7	1,4-2,0	2,7	1,9-3,8	
Current 1-19	0,9	0,9-1,0	1,3	1,1-1,6	
20+	1,3	1,1-1,6	2,1	1,5-2,9	
Body mass index					
<25	1		1		
25-<30	1,4	1,3-1,5	2,0	1,7-2,3	
30-<35	1,9	1,7-2,0	3,1	2,6-3,7	
35-<40	2,3	2,0-2,7	4,3	3,3-5,4	
40+	2,7	2,1-3,4	4,9	3,3-7,2	
Low intensity physical activity/week					
< 1 hour	1		1		
1-2 hours	0,9	0,8-1,0	0,6	0,6-0,8	
>= 3 hours	0,8	0,7-0,9	0,5	0,4-0,6	
High intensity physical activity/week					
< 1 hour	1		1		
1-2 hours	1,1	1,0-1,2	1,2	1,0-1,5	
>= 3 hours	1,0	0,9-1,1	1,4	1,0-1,9	
Cups of tea/day					
0	1		1		
1-2	1,1	1,0-1,2	1,3	1,1-1,5	
3+	1,3	1,2-1,5	1,5	1,1-1,8	
Cups of coffee/day					
0	1		1		
1-2	1,0	0,8-1,1	0,7	0,6-1,0	
3+	1,0	0,9-1,1	0,8	0,6-1,0	

<sup>1</sup> Adjusted for all the other lifestyle factors in the model, in addition to age, parity and coughing.