

LETTER

Validity of self-reported smoking among women hospital staff in Tunisia

In Tunisia, smoking prevalence is high¹ (55.6% males vs 5.2% females).² However, under-reporting of smoking may occur, particularly among women from cultures where social proscriptions still exist.³ No studies on women's smoking have been published in Tunisia which have validated self-reported smoking with biomarkers such as urinary cotinine.⁴

We aimed to assess the validity of self-reported smoking among female staff in a Tunisian hospital.

Our data were extracted from a cross-sectional study⁵ conducted between January and May 2005 to assess smoking behaviours of the health professional staff at Charles Nicolle Hospital in Tunis, the largest University Hospital in Tunisia.

About 1120 women were involved in the study and 809 (73%) provided a urine sample. The rate of participation did not differ significantly according to age, occupational group or self-reported smoking status. An anonymous questionnaire was administered. The 'smokers' category includes current smokers. Ex-smokers were those who had smoked at least 100 cigarettes in their life but were no longer smoking. The quantitative colorimetric urine test is based on the König reaction, in which pink-red chromophores formed from nicotine and its metabolite condensates with barbituric acid were extracted into an acetate buffer. As for the analytic condition, an aliquot of urine sample (0.5 ml) was mixed with 0.2 ml of 4 M acetate buffer (pH 4.7), with 0.1 ml of KCN (1%) and then 0.5 ml of barbituric acid (10%). The measurable time was defined as 45 min duration and absorbance at 510 nm.

Data were analysed by SPSS Version 16 using a Student's *t* test and χ^2 test. The significance threshold was 5%.

Among women who self-reported as smokers, 72.7% had a cotinine concentration of cut-off 6.6 $\mu\text{mol/ml}$ (table 1). Among self-reported ex-smokers and non smokers, 19.4% and 10% of women, respectively, had cotinine in their urine at the cut-off level. The validity of self-reported smoking was similar among subjects from different areas, ages and occupational group categories (table 1).

Non-smokers exposed to environmental tobacco smoke from other household members and friends may have cotinine in urine; however, the rate is typically below 6.6 $\mu\text{mol/ml}$.^{6,7} If we assume that all women who tested positive smoke daily or occa-

Table 1 Percentage of self-reported non-smokers having urinary cotinine higher than 6.6 $\mu\text{mol/ml}$ by socio-demographic groups and smoking status

Variables	Percentages	Probabilities
Professional category		
▶ Physicians—pharmacists, administrators (n=121)	11.1%	NS
▶ Nurses (n=418)	10.0%	
▶ Blue workers (n=130)	12.8%	
Area		
▶ Urban (n=510)	11.3%	NS
▶ Suburban (n=131)	09.4%	
▶ Rural (n=41)	04.7%	
Age group		
▶ 20–29 years (n=190)	13.4%	NS
▶ 30–39 years (n=205)	10.3%	
▶ >=40 years (n=286)	07.8%	
Self-reported smoking status		
▶ Current smokers (n=55)	72.7%	<0.0001
▶ Occasional smokers (n=21)	14.3%	
▶ Ex-smokers (n=31)	19.4%	
▶ No smokers (n=689)	10.0%	

sionally, the percentage of smokers increases from 9.5% to 18.4%. Self-reports of smoking are accurate in most studies in high-income countries,⁸ but may be under-reported in low- and middle-income countries, particularly in female and adolescents. For example, the prevalence of self-reported smoking among Iranian men and women aged 19 years and above was 18.7% and 1.3%, respectively, compared to 21.2% and 6.7% based on serum cotinine level.⁹

The study has some limitations. It was conducted among women in the health profession who are subject to both socio-cultural and professional pressures explaining the under-reporting of smoking status. In addition, since this study involved health professionals in a university hospital in the capital, our results cannot be generalised to all health professionals in the country.

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REFERENCES

1. **Fakhfakh R**, Hsairi M, Achour N. Epidemiology and prevention of tobacco use in Tunisia: a review. *Prev Med* 2005;**40**:652–7.
2. **Fakhfakh R**, Hsairi M, Maalej M, *et al*. Tobacco use in Tunisia: behaviour and awareness. *Bull World Health Organ* 2002;**80**:350–6.
3. **Kaplan M**, Carrier L, Waldron I. Gender difference in tobacco use in Kenya. *Soc Sci Med* 1990;**30**:305–10.
4. **Benowitz NL**. Cotinine as a biomarker of environmental tobacco smoke exposure. *Epidemiol Rev* 1996;**18**:188–204.
5. **Fakhfakh R**, Boujemaa O, Ben Salah F, *et al*. Smoking habits, knowledge and attitudes among hospital staff in Tunisia. *Tob Induc Dis* 2005;**3**:23. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2633491/?tool=pmcentrez> (accessed 15 Dec 2005).
6. **Jacob N**, Berry C, Boyer JC, *et al*. Urinary cotinine and nicotine metabolites measurement. *Ann Biol Clin (Paris)* 2005;**63**:397–409.
7. **Larramendy C**, Diviné C, Asnafi-Farhang S, *et al*. Usefulness of biological markers in evaluation of smoking. *Pathol Biol (Paris)* 2004;**52**:164–72.
8. **Patrick DL**, Cheadle A, Thompson DC, *et al*. The validity of self-reported smoking: a review and meta-analysis. *Am J Public Health* 1994;**84**:1086–93.
9. **Sarrafi-Zadegan N**, Boshtam M, Shahrokhi S, *et al*. Tobacco use among Iranian men women and adolescents. *Eur J Public Health* 2004;**14**:76–8.