

# Smokers with financial stress are more likely to want to quit but less likely to try or succeed: findings from the International Tobacco Control (ITC) Four Country Survey

Mohammad Siahpush<sup>1</sup>, Hua-Hie Yong<sup>2</sup>, Ron Borland<sup>2</sup>, Jessica L. Reid<sup>3</sup> & David Hammond<sup>3</sup>

Department of Health Promotion, Social and Behavioral Health, College of Public Health, University of Nebraska Medical Center; 986075 Nebraska Medical Center; Omaha, NE, USA,<sup>1</sup> The Cancer Council Victoria, Carlton, Victoria, Australia<sup>2</sup> and Department of Health Studies and Gerontology, University of Waterloo, Waterloo, ON, Canada<sup>3</sup>

## ABSTRACT

**Objective** To examine the association of financial stress with interest in quitting smoking, making a quit attempt and quit success. **Design and participants** The analysis used data from 4984 smokers who participated in waves 4 and 5 (2005–07) of the International Tobacco Control (ITC) Four Country Survey, a prospective study of a cohort of smokers in the United States, Canada, the United Kingdom and Australia. **Measurement** The outcomes were interest in quitting at wave 4, making a quit attempt and quit success at wave 5. The main predictor was financial stress at wave 4: '... because of a shortage of money, were you unable to pay any important bills on time, such as electricity, telephone or rent bills?'. Additional socio-demographic and smoking-related covariates were also examined. **Findings** Smokers with financial stress were more likely than others to have an interest in quitting at baseline [odds ratio (OR): 1.63; 95% confidence interval (CI): 1.22–2.19], but were less likely to have made a quit attempt at follow-up (OR: 0.74; 95% CI: 0.57–0.96). Among those who made a quit attempt, financial stress was associated with a lower probability of abstinence at follow-up (OR: 0.53; 95% CI: 0.33–0.87). **Conclusions** Cessation treatment efforts should consider assessing routinely the financial stress of their clients and providing additional counseling and resources for smokers who experience financial stress. Social policies that provide a safety net for people who might otherwise face severe financial problems, such as not being able to pay for rent or food, may have a favorable impact on cessation rates.

**Keywords** Financial stress, interest in quitting, quit attempt, quit success, smoking.

*Correspondence to:* Mohammad Siahpush, Department of Health Promotion, Social and Behavioral Health, College of Public Health, University of Nebraska Medical Center, 986075 Nebraska Medical Center, Omaha, NE 68198-6075, USA. E-mail: msiahpush@unmc.edu  
Submitted 28 July 2008; initial review completed 26 November 2008; final version accepted 10 March 2009

## INTRODUCTION

The association of common indicators of socio-economic position (education, occupation and income) with smoking are well established [1–4]. Less attention has been paid to how financial stress (FS) affects smoking behavior. FS is a direct indicator of economic deprivation [5] and often refers to not being able to pay for essentials such as food or rent due to shortage of money [6–9]. FS has also been shown to be associated with smoking. Using data on Australian households, Siahpush and colleagues showed that FS was associated

with a higher probability of reporting tobacco expenditure [6]. They also found that among smoking households, FS was related to a higher percentage of total household expenditure on tobacco. Graham's analysis of a cross-sectional sample of working-class mothers in the United Kingdom revealed that the main reason for relapse after cessation was difficulty in coping with daily problems and stress, including FS [10]. Dorsett & Marsh used longitudinal data from a sample of single mothers in the United Kingdom and showed that smoking was used as a coping mechanism and that financial hardship was the main barrier to cessation [11]. Similarly, a

recent longitudinal study in Australia revealed that smokers with FS were less likely to quit, and ex-smokers with greater FS were more likely to relapse [7].

These studies report uniformly an association between FS and higher probability of smoking or lower chances of successful cessation. However, owing to a lack of data availability, they provide no information on how FS is related to the pre-cessiation stages of planning to quit and making a quit attempt. Furthermore, for the same reason, these studies do not adjust for smoking-related variables such as tobacco dependence or self-efficacy to quit that are shown to be associated with socio-economic position, and are strong predictors of the propensity to quit and/or successful cessation [12–20]. The International Tobacco Control (ITC) Four Country Survey provides suitable longitudinal data to help address these shortcomings in the literature.

The aim of this paper was to examine the association of FS with interest in quitting (at study baseline), making a quit attempt and quit success (at follow-up), while adjusting for smoking-related psychosocial, motivational and behavioral factors as well as socio-demographic variables.

## METHOD

### Sample and design

Data came from waves 4 (2005–2006) and 5 (2006–2007) of the ITC Four Country Study. A detailed description of the survey methodology can be found elsewhere [21] (also see <http://www.itcproject.org>). Briefly, the ITC Four Country Study is a prospective cohort study designed to evaluate the psychosocial and behavioural impact of key national-level tobacco control policies enacted in the United States, Canada, United Kingdom and Australia. All aspects of the study protocol and survey measures are standardized across the four countries. Data collection is based on telephone interviews of a probability sample of smokers, with approximately 2000 smokers per country in each wave. The present analysis (maximum  $n = 4984$ ) included respondents who were daily or non-daily smokers at wave 4, were in one or more of the previous waves of the study, and participated in wave 5. The attrition rate from waves 4 to 5 was lowest in Australia (26%) and highest in the United States (36%).

The study protocol was cleared for ethics by the Institutional Review Boards or Research Ethics Boards in each of the countries: the University of Waterloo (Canada), Roswell Park Cancer Institute (USA), University of Illinois-Chicago (USA), University of Strathclyde (UK) and The Cancer Council Victoria (Australia).

## Outcomes

Interest in quitting at wave 4 was measured with the question: 'Are you planning to quit smoking: within the next month? Within the next 6 months? Some time in the future, beyond 6 months? Or not planning to quit?'. Those who were not planning to quit were distinguished from others. This grouping is consistent with our previous research [20,22]. However, other studies have distinguished smokers who plan to quit within the next 6 months [23] or within the next 3 or 4 months [24,25].

Respondents were characterized as having made a quit attempt in wave 5 if they responded affirmatively to the question: 'Have you made any attempts to stop smoking since we last talked with you, that is since [last survey date]?'.

Quit success was defined as being a smoker at wave 4 and reporting to be no longer smoking at wave 5. Quit success was defined only among respondents who reported in wave 5 to have made a quit attempt in the previous year.

## Covariates

All covariates were measured at wave 4. Financial stress was measured with the question: 'In the last month, because of a shortage of money, were you unable to pay any important bills on time, such as electricity, telephone or rent bills? [yes/no]'. This question is based directly on multi-item indices used in previous research on FS and smoking [6–9]. The FS question was not asked of respondents who were recruited in wave 4 (i.e. wave 4 replenishment sample).

### *Psychosocial covariates*

Perceived stress was measured with two of the items ( $r = 0.56$ ) from Cohen's four-item scale constructed for telephone interviews: 'How often have you felt that you were unable to control the important things in your life?' and 'How often have you felt difficulties were piling up so high that you could not overcome them?' [26]. Response options ranged from '1 = never' to '5 = very often' on a five-point scale. The mean of the two items was used in the analyses.

'Smoking-induced deprivation' [5] was measured with the question: 'In the last year, have you spent money on cigarettes that you knew would be better spent on household essentials like food? [yes/no]'.

The item 'You spend too much money on cigarettes' was coded on a five-point scale from '1 = strongly disagree' to '5 = strongly agree'.

Self-efficacy was measured with the question: 'If you decided to give up smoking completely in the next 6 months, how sure are you that you would succeed?'.

Response options ranged from '1 = not at all sure' to '5 = extremely sure' on a five-point scale.

#### *Motivational covariates*

Interest in quitting, described above, was used as a covariate in the quit attempt but not the quit success analysis, based on previous research showing it to be an important predictor for quit attempt [27]. Worries about health and quality of life were measured with: 'How worried are you, if at all, that smoking will damage your health in the future?' and 'How worried are you, if at all, that smoking will lower your quality of life in the future?'. Response options ranged from '1 = not at all worried' to '4 = very worried' on a four-point scale [27]. These two items correlated strongly ( $r = 0.73$ ). Their mean was used in the analyses.

The item 'To what extent, if at all, has smoking lowered your quality of life?' was coded on a four-point scale from '1 = not at all' to '4 = a great deal'.

#### *Behavioral covariate*

Tobacco dependence was measured using the Heaviness of Smoking Index (HSI), a short form of the Fagerstrom Tolerance Questionnaire [28–30]. HSI scores ranged from 0 to 6 and were calculated by summing the points for time to first cigarette after waking (in minutes) and number of cigarettes smoked per day. Time to first cigarette was scored: <5 minutes = 3 points; 6–30 minutes = 2 points; 31–60 minutes = 1 point; and >60 minutes = 0 point. Respondents were asked: 'On average, how many cigarettes do you smoke each day, including both factory-made and roll-your-own cigarettes?'. Cigarettes per day was scored: 1–10 = 0 point; 11–20 = 1 point; 21–30 = 2 points; and >31 = 3 points. Higher HSI scores indicate greater tobacco dependence.

#### *Socio-demographic covariates*

Age was categorized as: 18–24, 25–39, 40–54 and 55+ years. Level of education consisted of three categories: high school diploma or lower (low); technical, trade school, community college or some university (medium); and university degree (high). Annual income was categorized into 'under \$30 000' (low), '\$30 000–59 999' (medium) and '\$60 000 and over' (high) for the US, Canadian, and Australian samples. For the UK sample, the following categories were used: '£15 000 or under', '£15 001–30 000' and '£30 001 and over' [5,20,31].

#### **Analysis**

All analyses were performed in Stata version 10 SE [32]. Cases with missing values for any of the study variables were not included in the analyses. The variable with the

largest proportion of missing data (about 6%) was income. Logistic regression was employed to estimate the effect of FS and other covariates on interest in quitting, quit attempt and quit success. Longitudinal weights were used to report point estimates (Table 1) [21]. Unweighted data were used to report bivariate associations (Table 2) and in multivariable modeling (Table 3), which adjusted for demographic and other covariates.

## **RESULTS**

Table 1 provides weighted characteristics of the sample by country. About 12% of the total wave 4 sample experienced FS. The United Kingdom had the lowest (6%) and the United States had the highest (13%) percentage of smokers who reported FS. Canada had the highest (76%) and the United Kingdom had the lowest (64%) percentage of smokers who had an interest in quitting. The percentage of smokers who made a quit attempt was highest in Australia (42%) and lowest in the United States (33%). Successful cessation rate was highest in the United Kingdom (37%) and lowest in the United States (26%).

Table 2 shows the characteristics of smokers with FS and the bivariate associations of FS with the outcomes and other variables. Country data were pooled, as there was no evidence of interaction between FS and country in their association with the outcomes. About 83% of smokers with FS and 69% without FS had an interest in quitting. At the bivariate level, there was no association between FS and quit attempts. Among smokers who attempted to quit, 20% of those with FS and 31% of those without FS were successful. Smokers with financial stress were more likely to be younger and have a lower income than other smokers.

Table 3 shows adjusted odds ratios for the association of covariates with interest in quitting in the same wave, and quit attempt and quit success at the next wave. The odds of having an interest in quitting were 71% ( $P < 0.004$ ) higher in smokers with FS than others. Other factors that were associated with a higher probability of interest in quitting were: spending too much money on cigarettes, higher self-efficacy, being worried about the effect of cigarettes on health and quality of life, reporting that smoking has lowered one's quality of life, lower levels of nicotine dependence, being female, being under 40 years old, not having low education, and higher income. The probability of interest in quitting was highest in Australia and lowest in the United Kingdom. We note that when interest in quitting was defined as planning to quit within the next 6 months (compared to beyond 6 months or no plan at all), financial stress did not have an association with interest in quitting. Furthermore, among those who had an interest in quitting, there was no evidence of an association between financial stress and whether a

**Table 1** Sample characteristics (weighted).

Variables <sup>a</sup>	United States <i>n</i> = 1033	Canada <i>n</i> = 1192	United Kingdom <i>n</i> = 1161	Australia <i>n</i> = 1284
Interest in quitting	71.58	75.60	66.64	74.06
Made a quit attempt	32.49	36.55	35.86	41.12
Quit success	27.40	29.64	40.19	31.67
Financial stress	15.94	12.64	6.07	13.45
Perceived stress (mean)	2.42	2.22	2.25	2.29
Spent money on cigarettes instead of food	28.13	32.02	18.37	24.19
Spending too much money on cigarettes (mean)	3.99	3.97	3.78	4.02
Self-efficacy to quit (mean)	2.62	2.57	2.26	2.39
Worried smoking will damage health (mean)	2.62	2.63	2.53	2.56
Smoking has lowered quality of life (mean)	1.98	1.96	1.72	1.81
HSI (mean)	2.53	2.65	2.47	2.53
Female	45.90	46.24	46.89	44.96
Age (years)				
18–24	12.51	13.54	14.21	14.85
25–39	29.82	31.07	32.19	35.94
40–54	37.88	38.72	33.63	34.45
55+	19.79	16.67	19.98	14.77
Education				
Low	38.30	44.88	57.60	63.22
Medium	44.09	40.13	27.79	21.65
High	17.61	14.98	14.61	15.13
Income				
Low	39.14	28.11	25.49	25.61
Medium	36.67	39.02	39.48	35.87
High	24.19	32.87	35.03	38.53

All numbers are percentages unless otherwise specified. <sup>a</sup>All variables were measured at wave 4 except 'quit attempt' and 'quit success', which were measured at wave 5. HSI: Heaviness of Smoking Index.

respondent had an interest in quitting within the next 6 months or at some time in the future.

While FS and subsequent quit attempts were not associated at the bivariate level, after controlling for interest in quitting and the respondents' reports on whether smoking had lowered their quality of life at the baseline (wave 4), the data provided considerably more evidence for an association. In the multivariate analysis, the odds of making a quit attempt by the next wave were 26% ( $P = 0.023$ ) lower in smokers with FS than others. Interest in quitting, being worried about the effect of cigarettes on health and quality of life, reporting that smoking has lowered one's quality of life, lower nicotine dependence, being under 25 years old and not having low income were associated independently with a higher probability of making a subsequent quit attempt. The probability of a subsequent quit attempt was highest in Australia and lowest in the United States.

Among those who tried to quit smoking, the odds of a successful attempt were 48% ( $P = 0.012$ ) lower in smokers with financial stress than others. Lower nicotine addiction was associated independently with a higher probability of quit success. The probability of quit success was highest in the United Kingdom and lowest in Canada.

There was no interaction between FS and country in any of the regression models.

Whether a person had an interest in quitting, made a quit attempt or had quit smoking in wave 4 was not associated with being lost to follow-up in wave 5, with  $P$ -values of 0.797, 0.640 and 0.701, respectively. Lower age and education in wave 4 were associated with being lost to follow-up in wave 5, with  $P$  values of <0.001 and 0.006, respectively. None of the other covariates were associated with attrition. The exact impact of attrition on results cannot be assessed. However, by including the correlates of attrition (i.e. age and education) in the multivariate analyses, we have partially controlled for bias.

Supplementary analyses showed that there was no evidence of an association between financial stress and three variables in the ITC data set that pertain to the use of services or products to help cessation: use of 'stop-smoking medications' ( $P = 0.665$ ), doctors' 'help or referral to another service' as an aid to cessation ( $P = 0.791$ ) or use of telephone quitlines ( $P = 0.667$ ) in wave 5. Consequently, including these variables in the quit attempt and quit success analyses resulted in negligible change in the effect of financial stress. For example, when these three variables were included separately in the quit

**Table 2** Characteristics of smokers with financial stress ( $n = 4670$ ).

Variables <sup>a</sup>	Financial stress		$P^b$
	Yes	No	
Interest in quitting			<0.001
Yes	82.68	68.73	
No	17.32	31.27	
Made a quit attempt <sup>c</sup>			0.272
Yes	42.76	46.23	
No	57.24	53.77	
Quit success			0.013
Yes	22.31	33.49	
No	77.69	66.51	
Perceived stress (mean)	2.94	2.22	<0.001
Spent money on cigarettes instead of food			<0.001
Yes	48.53	21.57	
No	51.47	78.43	
Spending too much money on cigarettes (mean)	4.13	3.89	<0.001
Self-efficacy to quit (mean)	2.52	2.39	0.0218
Worried smoking will damage health (mean)	2.81	2.53	<0.001
Smoking has lowered quality of life (mean)	2.23	1.80	<0.001
HSI (mean)	2.69	2.59	0.1516
Sex			0.149
Female	59.22	55.88	
Male	40.78	44.12	
Age (years)			<0.001
18–24	12.04	6.84	
25–39	36.70	26.14	
40–54	36.89	42.22	
55+	14.37	24.80	
Education			0.601
Low	50.88	51.47	
Medium	34.05	32.15	
High	15.07	16.38	
Income			<0.001
Low	49.71	30.01	
Medium	34.56	37.66	
High	15.73	32.33	

All numbers are percentages unless specified otherwise. <sup>a</sup>All variables were measured at wave 4 except 'quit attempt' and 'quit success', which were measured at wave 5. <sup>b</sup> $P$ -values correspond to the association of financial stress and the variables in the table. <sup>c</sup>Quit attempt in this table is computed for respondents who reported to have an interest in quitting smoking. HSI: Heaviness of Smoking Index.

success regression model (Table 3), the odds ratio for the effect of financial stress changed from 0.5338 ( $P = 0.012$ ) to 0.5343 ( $P = 0.012$ ), 0.5083 ( $P = 0.007$ ) and 0.5336 ( $P = 0.012$ ), respectively.

In further supplementary analyses, we included health ('In general, how would you describe your health? Is it . . . 1. Poor, 2. Fair, 3. Good, 4. Very good, or 5.

Excellent') in the models. This variable was not associated with interest in quitting ( $P = 0.204$ ), quit attempt ( $P = 0.599$ ) or quit success ( $P = 0.312$ ). Consequently, the inclusion of health in the regression models did not make an appreciable change in the effect of financial stress. For example, after health was included in the quit success model, the odds ratio for financial stress changed from 0.534 ( $P = 0.012$ ) to 0.533 ( $P = 0.012$ ). Thus, we did not include health in the analyses.

## DISCUSSION

The study findings revealed that while smokers with financial stress were more likely than others to have an interest in quitting, they were marginally less likely to make a quit attempt and considerably less likely to stay quit. These results held across all four countries. To our knowledge, this was the first study to examine the association of FS with interest in quitting and subsequent quit attempt. The result of the cessation analysis was consistent with previous studies [6–11].

A major strength of this paper was its use of a unique international longitudinal data set devoted to collecting information on tobacco control and cessation. In addition to allowing us to examine the association of FS with interest in quitting, and also subsequent quit attempt and its success, the ITC Four Country Survey data made it possible to adjust for factors that are known to be important predictors of quitting motivation or behavior.

A possible weakness of the study was that it used a self-reported measurement of smoking status, which may have resulted in under-reporting of smoking. However, previous research has shown that questionnaire-based surveys of the general population provide a reliable estimate of smoking status when cotinine-validated, without systematic differentials in under-reporting by socio-economic groups [33,34]. The amount of misclassification (proportion of self-reported non-smokers with increased cotinine levels indicative of active smoking) is very low (for example, 0.9% [35] and 1.4% [36]) in most community-based studies [37], but much higher in clinical trials and intervention studies [37], especially among young adults [38]. Under-reporting of smoking is not a major concern in the present study, as our aim was not to provide accurate estimates of smoking intention, attempt or quit success rates, but to examine the association of these outcomes with FS.

We measured financial stress by assessing difficulty paying bills such as 'electricity, telephone or rent'. We did not have a separate question concerning difficulty in paying the mortgage by homeowners. In order to assess the impact of this exclusion, we performed supplementary analyses using an Australian national data set

**Table 3** Adjusted odds ratios (OR) and 95% confidence intervals (CI) from the effect of financial stress and other covariates on the odds of having an intention to quit, making a subsequent quit attempt and its success.

Covariates	Interest in quitting <i>n</i> = 4415		Quit attempt <i>n</i> = 3220		Quit success <i>n</i> = 1199	
	OR (95% CI)	<i>P</i>	OR (95% CI)	<i>P</i>	OR (95% CI)	<i>P</i>
Financial stress		0.001		0.025		0.012
Yes	1.63 (1.22–2.19)		0.74 (0.57–0.96)		0.53 (0.33–0.87)	
No	1.00		1.00		1.00	
Perceived stress	1.03 (0.95–1.11)	0.459	0.97 (0.89–1.04)	0.384	1.01 (0.89–1.15)	0.823
Spent money on cigarettes instead of food		0.951		0.131		0.928
Yes	0.99 (0.81–1.21)		1.16 (0.96–1.41)		0.99 (0.72–1.35)	
No	1.00		1.00		1.00	
Spending too much money on cigarettes	1.31 (1.21–1.42)	<0.001	0.96 (0.89–1.04)	0.351	0.97 (0.85–1.10)	0.638
Self-efficacy to quit	1.29 (1.20–1.37)	<0.001	1.07 (1.00–1.14)	0.065	1.07 (0.96–1.20)	0.242
Interest in quitting		–		<0.001		–
Yes	–		3.51 (2.82–4.37)		–	
No	–		1.00		–	
Worried smoking will damage health	3.05 (2.73–3.40)	<0.001	1.28 (1.15–1.42)	<0.001	0.99 (0.84–1.17)	0.921
Smoking has lowered quality of life	1.18 (1.05–1.33)	0.007	1.22 (1.10–1.36)	<0.001	0.89 (0.75–1.06)	0.203
HSI	0.81 (0.77–0.85)	<0.001	0.82 (0.78–0.87)	<0.001	0.86 (0.79–0.94)	0.001
Sex		0.083		0.794		0.138
Female	1.15 (0.98–1.35)		0.98 (0.83–1.15)		0.82 (0.63–1.07)	
Male	1.00		1.00		1.00	
Age (years)		<0.001		<0.001		0.776
18–24	1.00		1.00		1.00	
25–39	1.38 (0.98–1.95)		0.58 (0.42–0.81)		0.78 (0.48–1.25)	
40–54	0.76 (0.55–1.05)		0.56 (0.41–0.78)		0.81 (0.51–1.29)	
55+	0.61 (0.43–0.86)		0.85 (0.60–1.21)		0.84 (0.51–1.39)	
Education		0.015		0.144		0.493
Low	1.00		1.00		1.00	
Medium	1.30 (1.09–1.56)		1.20 (1.00–1.43)		1.16 (0.86–1.55)	
High	1.05 (0.83–1.32)		1.07 (0.86–1.34)		1.21 (0.84–1.73)	
Income		0.006		0.122		0.756
Low	1.00		1.00		1.00	
Medium	1.22 (1.01–1.48)		0.83 (0.68–1.00)		1.10 (0.79–1.53)	
High	1.41 (1.14–1.75)		0.94 (0.76–1.17)		0.99 (0.70–1.41)	
Country		<0.001		<0.001		0.015
United States	1.00		1.00		1.00	
Canada	1.41 (1.13–1.77)		0.97 (0.77–1.22)		0.92 (0.61–1.36)	
United Kingdom	1.00 (0.80–1.25)		1.14 (0.90–1.45)		1.63 (1.10–2.41)	
Australia	1.42 (1.13–1.78)		1.46 (1.16–1.83)		1.22 (0.83–1.78)	

HSI: Heaviness of Smoking Index.

known as Household Income and Labour Dynamics in Australia (2001) [7]. In this data set there are two separate financial stress items about difficulty paying 'electricity, gas and telephone bills on time' and paying 'mortgage or rent on time'. Among home owners who smoked ( $n = 1218$ ), only 1.8% did not have difficulty paying 'electricity, gas or telephone bills' but did have difficulty making mortgage payments. This indicates that asking owners a question about bills, as we have in this research, will capture the overwhelming majority of those who experience financial stress as is measured here.

While cessation was assessed at wave 5, financial stress in the past month was assessed at wave 4. Thus, the

effect of long-term or sustained financial stress on cessation and the other study outcomes was possibly underestimated, as the impact of any temporary financial stress may not be observed over a year.

While smokers in the United Kingdom had the smallest proportion who had an interest in quitting, they had the highest quit success compared to the other countries. The low motivation of the UK smokers to quit may be because of the fact that more of them lack knowledge of some health hazards of smoking and toxic constituents in smoke. UK smokers have the lowest proportion who believe that smoking causes stroke or lung cancer. They also have a considerably lower proportion of smokers

who believe that tobacco smoke contains cyanide, mercury, arsenic or carbon monoxide [31]. The higher rates of quit success in the United Kingdom can be attributed to the fact that it is the only country to have introduced a national smoking cessation treatment service [39]. Every Health Authority in the United Kingdom offers treatment to dependent smokers who want to quit through the National Health Service. Treatment is free to all users, although partial payment can be required for pharmacotherapies [40].

The observed age effect, that younger smokers are generally more likely to want to quit but less likely to make a quit attempt or succeed, is consistent with other population-based studies [7,20,27]. The direction of this effect can be understood with reference to previous studies indicating that older smokers: are less likely to accept evidence that smoking is detrimental to health [41]; have a less clear understanding of the etiological role of smoking in their illness, which reduces the likelihood of cessation [42]; believe commonly that 'the damage is done' and there is little to be gained from quitting [43]; are more likely to believe that it is actually harmful to stop smoking or that nicotine replacement therapy could be harmful [44]; and report many positive associations with smoking, which prevents a quit attempt [43].

The fact that smokers with FS were more likely than others to have an interest in quitting was not because they reported spending too much of their food (or other household essentials) money on cigarettes. The experience of FS, as defined in this research, is unique in that it produces a tangible threat to a person's material conditions of life. For example, not being able to pay rent poses the real threat of eviction and possible homelessness. It is perhaps this unique property of FS that leads a smoker to be seriously concerned about the financial consequences of smoking and thus have an interest in quitting smoking.

Previous research has shown that smokers with lower levels of education and income are less likely to have an interest in quitting [20]. It is interesting that while there is a close association between FS and lower socio-economic status, they are correlated with interest in quitting in opposite directions. Lower socio-economic smokers, compared to their higher socio-economic counterparts, are not as motivated to quit smoking, perhaps because of their lower knowledge of the harms of smoking [31]. However, smokers with FS who realize the possible financial consequences of smoking are likely to be motivated to quit, regardless of their socio-economic position.

Although more motivated to quit, smokers with FS were less likely to try to quit and to stay quit. The effect on trying becomes clear only when controlling for other pre-

dictors of quitting, again probably because factors correlated with FS affect quitting activity in different ways. It is important to note that in the cessation analysis, among all the individual predictors including psychological stress, only FS and nicotine dependence had an effect. The reason psychological stress was not associated with quit success, but FS was, could be related to the way in which these concepts were measured in the present research. While psychological stress referred to having difficulties coping with problems of life 'in general', FS pertained to 'specific' and consequential stressful experiences, such as the inability to pay rent. Previous research has shown that smokers who relapse often report that specific stressful experiences triggered their return to smoking [45].

Smokers with FS can benefit especially from quitting and not spending money on cigarettes. Recent research has shown that long-term cessation can lower the likelihood of experiencing financial stress and enhance material wellbeing [8,9]. Smokers with FS are thus caught in a vicious cycle. Compared to others they are less likely to quit, which means that they are more likely to experience even more FS, which in turn makes it even harder to quit. Cessation treatment efforts should consider assessing routinely the FS status of their clients and providing additional counseling and resources for smokers who experience FS. At a broader level, the findings indicate that social policies that provide a safety net for people who might otherwise face severe financial problems, such as not being able to pay for rent or food, could have a favorable impact on cessation rates.

#### Declarations of interest

None.

#### Acknowledgements

The research was funded by grants from the US National Cancer Institute/NIH [from the Roswell Park Transdisciplinary Tobacco Use Research Center (TTURC), P50 CA111236 and from R01 CA100362], the Canadian Institutes for Health Research, the Australian National Health and Medical Research Council, the Australian Commonwealth Department of Health and Aging, Cancer Research UK, the Centre for Behavioural Research and Program Evaluation of the National Cancer Institute of Canada/Canadian Cancer Society, the Canadian Tobacco Control Research Initiative and the Victorian Health Promotion Foundation (VicHealth).

#### References

1. Huisman M., Kunst A. E., Mackenbach J. P. Inequalities in the prevalence of smoking in the European Union: comparing education and income. *Prev Med* 2005; **40**: 756–64.
2. Barbeau E. M., Krieger N., Soobader M. J. Working class

- matters: socioeconomic disadvantage, race/ethnicity, gender, and smoking in NHIS 2000. *Am J Public Health* 2004; **94**: 269–78.
3. Pampel F. C. Patterns of tobacco use in the early epidemic stages: Malawi and Zambia, 2000–2002. *Am J Public Health* 2005; **95**: 1009–15.
  4. Sorensen G., Gupta P. C., Pednekar M. S. Social disparities in tobacco use in Mumbai, India: the roles of occupation, education, and gender. *Am J Public Health* 2005; **95**: 1003–8.
  5. Siahpush M., Borland R., Yong H.-H. Sociodemographic and psychosocial correlates of smoking-induced deprivation and its effect on quitting: findings from the International Tobacco Control Policy Evaluation Survey. *Tob Control* 2007; **16**: e2. doi:10.1136/tc.2006.016279. Available at: <http://tobaccocontrol.bmj.com/cgi/content/abstract/16/2/e2> (accessed 14 April 2009).
  6. Siahpush M., Borland R., Scollo M. Smoking and financial stress. *Tob Control* 2003; **12**: 60–6.
  7. Siahpush M., Carlin J. B. Financial stress, smoking cessation and relapse: results from a prospective study of an Australian national sample. *Addiction* 2006; **110**: 121–7.
  8. Siahpush M., Spittal M., Singh G. K. Association of smoking cessation with financial stress and material well-being: results from a prospective study of a population-based national survey. *Am J Public Health* 2007; **97**: 2281–7.
  9. Siahpush M., Spittal M., Singh G. K. Smoking cessation and financial stress. *J Public Health* 2007; **29**: 338–42.
  10. Graham H. *When Life's a Drag: Women, Smoking and Disadvantage*. London: Department of Health; 1993.
  11. Dorsett R., Marsh A. *The Health Trap: Poverty, Smoking and Lone Parenthood*. London: Policy Studies Institute; 1998.
  12. Tillgren P., Halund B. J., Lundberg M., Romelsjo A. The sociodemographic pattern of tobacco cessation in the 1980s: results from a panel study of living condition surveys in Sweden. *J Epidemiol Commun Health* 1996; **50**: 625–30.
  13. Stronks K., van de Mheen H. D., Looman C. W. N., Mackenbach J. P. Cultural, material, and psychosocial correlates of the socioeconomic gradient in smoking behavior among adults. *Prev Med* 1997; **26**: 754–66.
  14. Rose J. S., Chassin L., Presson C. C., Sherman S. J. Prospective predictors of quit attempts and smoking cessation in young adults. *Health Psychol* 1996; **15**: 261–8.
  15. Hymowitz N., Cummings K. M., Hyland A., Lynn W. R., Pechacek T. F., Hartwell T. D. Predictors of smoking cessation in a cohort of adult smokers followed for five years. *Tob Control* 1997; **6**: ii57–62.
  16. Osler M., Prescott E. Psychosocial, behavioural, and health determinants of successful smoking cessation: a longitudinal study of Danish adults. *Tob Control* 1998; **7**: 262–7.
  17. Zentner L., Borland R. The roles of temptation strength and self-efficacy in predicting smoking cessation attempts. *Behav Change* 1995; **12**: 191–5.
  18. Hennrikus D. J., Jeffery R. W., Lando H. A. The smoking cessation process: longitudinal observations in a working population. *Prev Med* 1995; **24**: 235–44.
  19. Stuart K., Borland R., McMurray N. Self-efficacy, health locus of control, and smoking cessation. *Addict Behav* 1994; **19**: 1–12.
  20. Siahpush M., McNeill A., Borland R., Fong G. T. Socioeconomic variations in nicotine dependence, self-efficacy and intention to quit across four countries: findings from the International Tobacco Control Policy Evaluation Survey. *Tob Control* 2006; **15**: iii71–5.
  21. Thompson M., Fong G. T., Hammond D., Boudreau C., Driezen P., Hyland A. *et al.* The methodology of the Four-Country International Tobacco Control Policy Evaluation Survey. *Tob Control* 2006; **15**: iii12–18.
  22. Siahpush M., Borland R., Yong H.-H., Kin F., Sirirassamee B. Socio-economic variations in tobacco consumption, intention to quit and self-efficacy to quit among male smokers in Thailand and Malaysia: results from the International Tobacco Control–South-East Asia (ITC-SEA) Survey. *Addiction* 2008; **103**: 502–8.
  23. Hammond D., Fong G. T., McDonald P. W., Cameron R., Brown K. S. Impact of the graphic Canadian warning labels on adult smoking behavior. *Tob Control* 2003; **12**: 391–5.
  24. Nguyet N. M., Beland F., Otis J. Is the intention to quit smoking influenced by other heart-healthy lifestyle habits in 30- to 60-year-old men? *Addict Behav* 1998; **23**: 23–30.
  25. Rise J., Kovac V., Kraft P., Moan I. S. Predicting the intention to quit smoking and quitting behavior: extending the theory of planned behavior. *Br J Health Psychol* 2008; **13**: 291–310.
  26. Cohen S., Kamarck T., Mermelstein R. A global measure of perceived stress. *J Health Soc Behav* 1983; **24**: 386–96.
  27. Hyland A., Borland R., Li Q., Yong H.-H., McNeill A., Fong G. T. *et al.* Individual-level predictors of cessation behaviors among participants in the International Tobacco Control (ITC) Policy Evaluation Study. *Tob Control* 2006; **15**: iii83–94.
  28. Kozlowski L., Porter C. Q., Orleans C. T., Pope M. A., Heatherton T. F. Predicting smoking cessation with self-reported measures of nicotine dependence: FTQ, FTND, and HSI. *Drug Alcohol Depend* 1994; **34**: 211–6.
  29. Heatherton T. F., Kozlowski L., Frecker R. C., Fagerstrom K. O. The Fagerstrom Test for nicotine dependence: a revision of the Fagerstrom Tolerance Questionnaire. *Br J Addict* 1991; **86**: 1119–27.
  30. Heatherton T. F., Kozlowski L., Frecker R. C., Rickert W., Robinson J. Measuring the heaviness of smoking: using self-reported time to the first cigarette of the day and number of cigarettes smoked per day. *Br J Addict* 1989; **84**: 791–9.
  31. Siahpush M., McNeill A., Hammond D., Fong G. Socioeconomic and country variations in knowledge of health risks of tobacco smoking and toxic constituents of smoke: results from the 2002 International Tobacco Control Policy Evaluation Survey. *Tob Control* 2006; **15**: iii65–70.
  32. StataCorp. *Stata Statistical Software: Release 10, Special Edition*. College Station, TX: StataCorp LP; 2007.
  33. Vartiainen E., Seppala T., Lillsunde P., Puska P. Validation of self reported smoking by serum cotinine measurement in a community-based study. *J Epidemiol Commun Health* 2002; **56**: 167–70.
  34. Graham H., Owen L. Are there socioeconomic differentials in under-reporting of smoking in pregnancy? *Tob Control* 2003; **12**: 434–6.
  35. Wald N., Nanchahal K., Thompson S., Cuckle H. Does breathing other people's tobacco smoke cause lung cancer? *BMJ* 1986; **293**: 1217–22.
  36. Caraballo R., Giovino G., Pechacek T., Mowery P. Factors associated with discrepancies between self-reports on cigarette smoking and measured serum cotinine levels among persons aged 17 years or older: third National Health and Nutrition Examination Survey, 1988–1994. *Am J Epidemiol* 2001; **153**: 807–14.

37. Rebagliato M. Validation of self reported smoking; the use of cotinine as a biomarker for exposure to smoking. *J Epidemiol Commun Health* 2002; **56**: 163–4.
38. Robinson L. A., Vander Weg M. W., Riedel B. W., Klesges R. C., McLain-Allen B. 'Start to stop': results of a randomised controlled trial of a smoking cessation programme for teens. *Tob Control* 2003; **12**: iv26–33.
39. Low A., Unsworth L., Low A., Miller I. Avoiding the danger that stop smoking services may exacerbate health inequalities: building equity into performance assessment. *BMC Public Health* 2007; **7**: 198.
40. McNeill A., Raw M., Whybrow J., Bailey P. A national strategy for smoking cessation treatment in England. *Addiction* 2005; **100**: 1–11.
41. Connolly M. Smoking cessation in old age: closing the stable door? *Age Ageing* 2000; **29**: 193–5.
42. Buckland A., Connolly M. Age-related differences in smoking cessation advice and support given to patients hospitalized with smoking-related illness. *Age Ageing* 2005; **34**: 639–41.
43. Kerr S., Watson H., Tolson D., Lough M., Brown M. Smoking after the age of 65 years: a qualitative exploration of older current and former smokers' views on smoking, stopping smoking, and smoking cessation resources and services. *Health Soc Care Commun* 2006; **14**: 572–82.
44. Schofield I. Supporting older people to quit smoking. *Nurs Older People* 2006; **18**: 29–33.
45. Cohen S., Lichtenstein E. Perceived stress, quitting smoking, and smoking relapse. *Health Psychol* 1990; **9**: 466–78.