Prevalence and characteristics of hardcore smokers in Hong Kong

DYP Leung *, SSC Chan, TH Lam

K E Y   M E S S A G E S

1. The proportion of hardcore smokers among male and female smokers increased from 2005 to 2008. This indicates that a smoking habit is becoming more ingrained among smokers in Hong Kong, regardless of gender.

2. A demographic profile of hardcore smokers reveals that they are less likely to be aware of existing smoking cessation services. This suggests a need to strengthen the existing cessation services for the whole smoking population, in particular hardcore smokers.

3. Although the implementation of smoke-free legislation may have provided an environment to reduce social smoking in the community, it appears that the determination of Hong Kong's smoking population is driven by psychosocial factors.

[1] **DYP Leung**, [2] **SSC Chan**, [3] **TH Lam**

[1] Nethersole School of Nursing, The Chinese University of Hong Kong
[2] School of Nursing, The University of Hong Kong
[3] School of Public Health, The University of Hong Kong

* Principal applicant and corresponding author: dorisleung@cuhk.edu.hk

Introduction

Tobacco control in Hong Kong has been carried out since the early 1980s, and control measures have increased in intensity since 2007. Although the overall smoking prevalence declined gradually from 15.7% in 1990 to 11.8% in 2008, there were 679 500 daily smokers aged ≥15 years in 2008, of whom 55.5% had never tried and did not want to give up smoking, and 92.0% would not try any existing cessation services.[1] There is a sizeable group of smokers who are resistant to giving up or a hardening of the smoking population in Hong Kong.[2] This study aimed to estimate the prevalence of hardcore smokers in Hong Kong, identify demographic, environmental, and smoking-related factors associated with hardcore smoking by gender, and compare their awareness of current smoking cessation services with that of other smoking subgroups.

Methods

Study design

This study was conducted from December 2010 to May 2011. We conducted a secondary analysis of population data on patterns of smoking from the Thematic Household Survey (THS) in 2005 and 2008. We included 3740 and 2958 current daily smokers aged ≥15 years who responded to the THS2005 and THS2008, respectively.

Outcome measures

Based on THS2005 and THS2008, there were two types of hardcore smokers (ie HC2A and HC2B). HC2A was defined as those who (1) were daily smokers, (2) had a smoking history of at least 6 years, (3) had no history of quit attempts, (4) did not want to give up smoking, (5) smoked ≥11 cigarettes per day on average, and (6) were 26 years or older. HC2B was the same as HC2A except that average number of cigarettes smoked per day was ≥15. HC2A was computed for both surveys, whereas HC2B was computed for THS2008 only because daily cigarette consumption was in a categorical format (≤10, 11-20, 21-30, 31+) in THS2005. Smokers who do not meet the criteria for HC2A were considered as non-HC2A. A similar definition was applied to non-HC2B.

Results

Prevalence of hardcore smoking

Using the HC2A definition, 21.8% (in 2005) and 27.4% (in 2008) of daily smokers aged ≥15 years were classified as hardcore. From 2005 to 2008, the rate went up from 23.8% to 29.4% in men and from 10.6% to 16.3% in women, increasing in all five age groups (Table 1). The prevalence in 2005 and 2008 increased with age, reaching a peak in the 50-59 age-group and then dropping in the 60+ age-group. Using the more stringent HC2B definition, 25.7% of daily smokers in the THS2008 sample were hardcore. The differences between HC2A and HC2B were within 3%.

Factors associated with hardcore smoking in Hong Kong

Under HC2A, 27 associated factors were identified

TABLE I. Prevalence of hardcore smoking in Hong Kong by age, gender, and survey year

Parameter	THS2005 (n=3740)		THS2008 (n=2958)		
	No.	% (95% CI) of participants defined as HC2A	No.	% (95% CI) of participants defined as HC2A	% (95% CI) of participants defined as HC2B
Age group (years)					
15-29	691	7.5 (5.8-9.7)	537	12.1 (9.6-15.1)	11.5 (9.1-14.5)
30-39	813	21.8 (19.1-24.7)	627	27.4 (24.1-31.1)	26.5 (23.2-30.1)
40-49	875	25.0 (22.3-28.0)	680	32.1 (28.7-35.7)	30.0 (26.7-33.6)
50-59	654	29.8 (26.4-33.4)	601	34.6 (30.9-38.5)	32.1 (28.5-36.0)
60+	707	24.6 (21.6-27.9)	513	28.7 (24.9-32.7)	26.3 (22.7-30.3)
Gender					
Male	3192	23.8 (22.3-25.3)	2497	29.4 (27.7-31.3)	27.6 (25.9-29.4)
Female	548	10.6 (8.3-13.4)	461	16.3 (13.2-19.9)	15.4 (12.4-19.0)
Total	3740	21.8 (20.6-23.2)	2958	27.4 (25.8-29.0)	25.7 (24.2-27.3)

in the bivariate analysis for the overall sample (Table 2). Among them, three demographic variables (age, marital status, and gender), two smoking-related variables (age started smoking and started smoking 'for refreshment'), seven cessation-related variables (awareness of smoking cessation clinics, and six reasons for not wanting to give up: 'smoking had become a habit', 'not enough determination', 'most friends or colleagues are smokers', 'necessity in social function', 'necessity for killing time', and 'necessity for easing tension'), and three interaction terms with 'year' ('necessity as a refreshment', 'necessity in social function', and 'necessity for killing time') were significant in the logistic regression model.

Slightly different factors associated with hardcore smoking were observed in the male and female sub-samples. Again, the factors identified for HC2A among male smokers were similar to those for the overall sample in the final logistic regression models, except for 'necessity for easing tension'. Among female smokers, only six factors were associated with HC2A (age, educational level, started smoking because of 'social needs', not wanting to give up because 'smoking had become a habit', 'necessity for killing time', and 'necessity for easing tension'), but no interaction term with 'year' was significant.

Both similar and different variables were associated with hardcore smoking were the two reasons for starting to smoke ('to kill time' and associated with HC2B when compared with HC2A using THS2008 (Table 3). The significant similar variables included age, gender, age started smoking, awareness of smoking cessation clinics, 'smoking had become a habit', 'not enough determination', 'most friends or colleagues are smokers', 'necessity as a refreshment', and 'necessity for easing tension', whereas the significant different variables were the two reasons for starting to smoke ('to kill time' and 'to make oneself look more mature/stylish') and the two reasons for not wanting to give up ('never thought of quitting' and 'smoking is not harmful to health').

The direction and extent of association of the factors with hardcore smoking, regardless of its definition, were consistent. In particular, smokers in the 15-29 age-group who were married and aware of existing cessation services were less likely to be hardcore, whereas those with reasons for not wanting to give up were more likely to be so. As for the interaction term with 'year', the impact of 'necessity as a refreshment' on the likelihood of being hardcore increased from 2005 to 2008, whereas that of 'necessity in social function' decreased.

Discussion

The prevalence of hardcore smokers in Hong Kong is higher than that in other countries, except for Italy.[3-6] Respectively in 2005 and 2008, 21.8% and 27.4% of Hong Kong smokers aged ≥15 years could be considered hardcore under the HC2A definition, and would have been as high as 25.7% in 2008 under the more stringent definition HC2B. Given that the overall smoking prevalence in Hong Kong decreased from 14.0% in 2005 to 11.8% in 2008, the increase in proportion of hardcore smokers suggests a hardening of the smoking population.[3] With an increase in both male (23.8% in 2005 to 29.4% in 2008) and female (10.6% in 2005 to 16.3% in 2008) hardcore smokers under HC2A, the hardening occurred in both populations.

As reported in previous studies,[4-7] hardcore smokers differed substantially to their non-hardcore counterparts in the logistic regression models. Overall, age, gender, marital status, and age at which

TABLE 2. Logistic regression of hardcore smoking HC2A for the overall sample and gender subsamples

Parameter	P value and OR (95% CI)*					
	Overall		Male		Female	
	Main effect	Interaction term with 'year'	Main effect	Interaction term with 'year'	Main effect	Interaction term with 'year'
Year	P=0.924	NA	P=0.910	NA	P=0.435	NA
Age group (years)	P<0.001	P=0.222	P<0.001	P=0.280	P=0.003	P=0.063
15-29	0.15 (0.09-0.25)		0.14 (0.08-0.24)		0.66 (0.01-0.35)	
30-39	0.81 (0.56-1.18)		0.84 (0.57-1.25)		0.12 (0.03-0.52)	
40-49	1.09 (0.78-1.52)		1.08 (0.76-1.54)		0.41 (0.11-1.55)	
50-59	1.41 (1.03-1.92)		1.41 (1.02-1.95)		0.87 (0.25-3.00)	
60+	1.00		1.00		1.00	
Marital status	P<0.001	P=0.149	P<0.001	P=0.060	P=0.689	P=0.834
Single	1.00		1.00			
Married	0.55 (0.42-0.72)		0.63 (0.40-0.70)			
Separated/divorced	1.00 (0.61-1.64)		1.14 (0.66-1.97)			
Widowed	0.50 (0.29-0.87)		0.38 (0.20-0.73)			
Gender	P=0.015	P=0.407	NA	NA	NA	NA
Male	1.51 (1.08-2.10)					
Female	1.00					
Educational level	P=0.070	P=0.373	P=0.068	P=0.269	P=0.002	P=0.058
No schooling / kindergarten / primary					0.15 (0.03-0.81)	
Secondary / matriculation					0.76 (0.34-4.38)	
Tertiary					1.00	
Household income level (monthly)	P=0.823	P=0.463	P=0.884	P=0.445	P=0.352	P=0.293
Employment status					P=0.537	P=0.322
Occupation	P=0.159	P=0.106	P=0.571	P=0.152		
Industry engaged in	P=0.949	P=0.792	P=0.867	P=0.563		
Nature of the workplace	P=0.954	P=0.701	P=0.982	P=0.358		
Age starting smoking cigarette (years)	P<0.001	P=0.201	P<0.001	P=0.134	P=0.098	P=0.484
<20	1.97 (1.22-3.17)		2.09 (1.21-3.60)			
20-24	1.40 (0.85-2.28)		1.50 (0.86-2.22)			
25-29	1.26 (0.69-2.30)		1.12 (0.56-2.22)			
30+	1.00		1.00			
Smokers within 3 metres in the workplace	P=0.062	P=0.947	P=0.093	P=0.947	P=0.266	P=0.910
Aware of any smoking cessation clinics or centres in Hong Kong	0.68 (0.55-0.84) P<0.001	P=0.647	0.67 (0.53-0.84) P=0.001	P=0.926	P=0.294	P=0.402
Heard about telephone smoking cessation services	P=0.140	P=0.756	P=0.060	P=0.813		
Reasons for starting to smoke cigarettes						
Influenced by parents/other family members	P=0.992	P=0.400	P=0.724	P=0.656		
Out of curiosity/fun					P=0.103	P=0.920
For refreshment	1.45 (1.02-2.06) P=0.038	P=0.413	1.50 (1.04-1.49) P=0.032	P=0.414		
Social needs					0.19 (0.04-0.94) P=0.042	NA
To kill time	P=0.787	P=0.381	P=0.282	P=0.814		
To ease tension	P=0.966	P=0.820	P=0.991	P=0.883		

* OR (95% CI) for significant variables only

TABLE 2. (cont'd)

Parameter	P value and OR (95% CI)*					
	Overall		Male		Female	
	Main effect	Interaction term with 'year'	Main effect	Interaction term with 'year'	Main effect	Interaction term with 'year'
Reasons for not wanting to give up smoking						
Smoking had become a habit	5.11 (4.18-6.23) P<0.001	P=0.329	5.32 (4.31-6.57) P<0.001	P=0.279	4.71 (2.35-9.43) P<0.001	P=0.804
Not enough determination	1.82 (1.47-2.25) P<0.001	P=0.896	1.93 (1.54-2.41) P<0.001	P=0.868		
Most friends or colleagues are smokers	1.55 (1.22-1.96) P<0.001	P=0.828	1.50 (1.17-1.92) P=0.001	P=0.900	P=0.128	P=0.627
Severe psychological/physical discomfort when quitting smoking	P=0.091	P=0.413	P=0.183	P=0.457	P=0.081	NA
Necessity as a refreshment	P=0.126	2.78 (1.30-5.90) P=0.008	P=0.149	2.84 (1.30-6.23) P=0.009		
Necessity in social functions	1.54 (1.14-2.09) P=0.005	0.50 (0.28-0.89) P=0.018	1.52 (1.11-2.09) P=0.009	0.53 (0.29-0.97) P=0.040		
Necessity for killing time	1.80 (1.34-2.42) P<0.001	0.56 (0.36-0.89) P=0.013	1.74 (1.27-2.40) P=0.001	0.59 (0.36-0.95) P=0.003	2.82 (1.20-6.61) P=0.017	P=0.343
Necessity for easing tension	1.55 (1.09-2.21) P=0.015	P=0.131	P=0.077	P=0.077	2.59 (1.03-6.52) P=0.043	P=0.765
Too easy to get cigarettes or other forms of tobacco product	P=0.786	P=0.792	P=0.876	P=0.705		
Worried about getting sick after quitting smoking	P=0.154	P=0.271	P=0.232	P=0.238		
Worried about getting fat after quitting smoking	P=0.575	P=0.489	P=0.663	P=0.509	P=0.395	P=1.00

they started smoking were associated with hardcore smoking. These results suggest that Hong Kong smokers in the 15-29 age-group who are married are less likely to be hardcore, whereas males who started smoking under 20 years old are more likely to be hardcore. Surprisingly, daily cigarette consumption was consistently a non-significant factor of hardcore smoking in all bivariate analyses in the overall sample and the two gender sub-samples, regardless of definitions. This might be due to the small amount of variation in the individual's daily cigarette consumption: about half the sample smoked 1-10 cigarettes, slightly less than half smoked 11-20, and only about 5% smoked >20 a day, according to THS2005 and THS2008.

Psychological factors might play a key role in hardening of smoking; several reasons for not wanting to give up smoking ('smoking has become a habit', 'not enough determination', 'most friends or colleagues are smokers', 'necessity as a refreshment', 'necessity as a social function', and 'necessity for easing tension') were consistent predictors of hardcore smoking (HC2A and HC2B) in the overall sample. In addition, the impact of 'necessity as refreshment' on

the likelihood of being a hardcore smoker (HC2A) has increased, whereas that of 'necessity in social functions' and 'necessity for killing time' have decreased in both the overall sample and male sub-sample since the implementation of comprehensive smoke-free legislation on 1 January 2007. This may be due to changes in the smoking environment. Smokers are no longer allowed to smoke indoors at their workplace or social functions. Further studies should examine this assertion. Among females, only a few factors were associated with hardcore smoking. This may have been due to the small female sample and many predictors considered in the logistic regression model, leading to a lack of statistical power. Nevertheless, the current findings highlight the important role of psychological factors in hardcore smoking among Hong Kong people. Psychosocial factors, such as attitudes toward second-hand smoke exposure or smoking cessation, perceived health status, perceived stress, and quitting self-efficacy should all be examined in future studies.[7] In addition, nicotine dependency is consistently reported as a predictor of hardcore smoking but was not measured in THS2005 and

TABLE 3. Logistic regression of hardcore smoking HC2B for the overall sample and gender subsamples

Parameter	P value and OR (95% CI)*		
	Overall	Male	Female
Age-group (years)	P<0.001	P<0.001	P<0.001
15-29	0.34 (0.20-0.56)	0.37 (0.24-0.60)	0.48 (0.10-2.39)
30-39	1.66 (1.10-2.51)	1.87 (1.23-2.83)	1.85 (0.48-7.05)
40-49	1.87 (1.29-2.71)	1.66 (1.13-2.44)	6.74 (1.88-24.20)
50-59	1.85 (1.31-2.63)	1.81 (1.27-2.60)	3.45 (0.88-13.57)
60+	1.00	1.00	1.00
Marital status	P=0.332		P=0.944
Gender	P=0.001	NA	NA
Male	1.82(1.30-2.55)		
Female	1.00		
Educational level	P=0.203	P=0.162	
Household income level (monthly)	P=0.524	P=0.468	
Occupation	P=0.184		
Industry engaged in	P=0.815		
Nature of the workplace	P=0.182	P=0.169	
Age starting smoking cigarette (years)	P<0.001	P<0.001	P=0.051
<20	3.08 (1.57-6.06)	4.61(1.97-10.79)	
20-24	2.21 (1.11-4.41)	3.71(1.57-8.79)	
25-29	1.51 (0.62-3.64)	2.12(0.75-5.95)	
30+	1.00	1.00	
Smokers within 3 metres in the workplace	P=0.150		P=0.053
Aware of any smoking cessation clinics or centres in Hong Kong	0.70 (0.53-0.92) P=0.011	P=0.068	0.35 (0.15-0.81) P=0.015
Heard about telephone smoking cessation services	P=0.427	P=0.252	P=0.281
Reasons for starting to smoke cigarettes			
Influenced by parents/ other family members	P=0.174	P=0.270	
To kill time	0.46(0.23-0.92) P=0.028	P=0.145	
To ease tension	P=0.741	P=0.608	
To make oneself look more mature/ stylish	2.55 (1.21-5.37) P=0.041	2.38 (1.10-5.14) P=0.028	
Reasons for not wanting to give up smoking			
Smoking had become a habit	9.68 (7.50-12.50) P<0.001	9.90 (7.55-13.00) P<0.001	7.86 (3.72-16.63) P<0.001
Not enough determination	2.77 (2.04-3.76) P<0.001	2.91 (2.10-4.02) P<0.001	
Most friends or colleagues are smokers	2.01 (1.42-2.85) P<0.001	1.94 (1.34-2.81) P<0.001	4.15 (1.39-12.32) P=0.011
Necessity as a refreshment	3.75 (1.91-7.36) P<0.001	4.16 (2.08-8.30) P<0.001	
Necessity in social functions	P=0.700	P=0.971	
Necessity for killing time	P=0.599	P=0.655	
Necessity for easing tension	3.79 (2.18-6.58) P<0.001	4.09 (2.22-7.54) P<0.001	
Never thought of quitting smoking	14.34 (10.22-20.12) P<0.001	15.66 (10.89-22.51) P<0.001	10.28 (4.00-26.38) P<0.001
Smoking is not harmful to health	45.29 (4.55-450.42) P=0.001	45.29 (4.57-499.26) P=0.001	

* OR (95% CI) for significant variables only

THS2008. This precluded us from examining the relationship. It is possible that variations in hardcore smoking explained by psychological factors might diminish if nicotine dependency were included in the models.

In the multivariate logistic regression models, awareness of existing cessation services was, in general, negatively associated with hardcore smoking in the overall sample and the two gender sub-samples, regardless of the definition of hardcore smoking used. Although the proportion of smokers aware of existing cessation services increased from 40.8% in 2005 to 60.6% in 2008 over the whole smoking population,[1] our findings suggest that such awareness is limited and insufficient to encourage giving up among hardcore smokers and the *entire* smoking population in Hong Kong. Our findings also suggest that there may be a gender difference in the demographic profile of hardcore smokers. In particular, females were less likely to be economically active than their male counterparts. This result highlights the potential need to strengthen the promotion of smoking cessation among female smokers who are under financial strain. Nonetheless, these results should be interpreted with caution because of unreliable estimates in the logistic regression.

Limitations

The present study has several limitations, and the results should be interpreted with caution. First, since we performed a secondary analysis of an existing data set, and many variables measured in THS2005 were in categorical format, we were unable to match exactly all the criteria of hardcore smoking reported in the literature. In particular, we could only ascertain that certain people had been smoking for 1 to 9 years according to our own calculations; and this group of smokers has not been classified as hardcore. Our results might have underestimated the proportion of hardcore smokers in the smoking population. Second, there were only a few female smokers in the sample and a large number of predictors considered in the models definitely entailed low power statistical tests. As such, the results for female smokers should be interpreted with caution. Third, some previously reported predictors of hardcore smoking, such as nicotine dependency, were not included in the THS2005 and THS2008. This prevented projecting the full picture of factors associated with hardcore smoking and limited the comparability of the current results with those of previous studies from other countries.

Conclusion

Although the implementation of smoke-free legislation may have provided an environment to reduce social smoking in the community, hardening of smoking was driven by psychosocial factors. There may be a need to provide more effective and tailor-made treatments that focus on self-efficacy in resisting smoking. Our findings also shed light on the direction that future cessation services should take. In particular, treatment should focus on breaking the link between smoking and habit, and include a component that tackles external stimuli such as 'smoking is for refreshment and easing tension'.

Acknowledgements

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