

CIGARETTE SMOKING AMONG SCHOOL CHILDREN IN SINGAPORE.

PART I - SMOKING PREVALENCE

S C Emmanuel, C K Ho, A J Chen

ABSTRACT

A cross sectional nationally representative survey of 33,110 school-going children in Singapore aged between 9 and 20 years was carried out to obtain, for the first time, baseline information on smoking among the school-going population in Singapore.

The survey was carried out among students attending vocational institutes and public sector schools in Singapore in 1987.

The overall smoking prevalence was found to be 2% (3% among boys and 0.2% among girls). Ex-smokers comprised 2% of respondents whilst those who had only experimented with smoking made up 9% of the respondents.

Analyses of the data showed that cigarette smoking was more prevalent among Malays, among boys, among older children, and among the less academically inclined. On average, boys smoked a median of 20 cigarettes a week and girls, 12 cigarettes a week.

On an international basis, the smoking prevalence among the school-going population in Singapore is significantly lower than that of developed countries like Australia, England and Wales and neighbouring countries such as Malaysia.

Keywords: first assessment of smoking prevalence, school-going population, current smokers, ex-smokers, non-smokers

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INTRODUCTION

Strategies against cigarette smoking in Singapore were intensified with the announcing of the national objective "Towards A Nation of Non-Smokers" in January 1987. Among the activities drawn up were major programmes which aimed to heighten the degree of awareness of the harmful effects of cigarette smoking among Singaporeans. Non-smokers, especially school children, were the main target of this health education campaign, the message exhorted being "if you don't smoke, don't start". This is in acknowledgement of the fact that the most successful outcome of any large scale programme to contain smoking lies in dissuading non-smokers from

taking up the habit as compared with trying to convert existing smokers.

Surveys to gauge smoking levels among the adult population had been carried out regularly by the Ministry of Health(1-3). Prevalence levels among the school-going population however, had not been assessed before. The Research & Evaluation (R & E) Department of the Ministry of Health therefore undertook this first-ever effort to ascertain the extent of cigarette smoking among the school-going population in the country, as well as to obtain detailed information on the smoking habits, attitude and behaviour of the young smokers. The results from this survey would provide valuable information for the planning of national anti-smoking programmes targeted at the young - whether it be to discourage existing young smokers from continuing with the habit or preventing future generations of school children from experimenting with smoking, and possibly going on to become smokers.

There were two components to this survey. The first, conducted in January 1987, used as its target population all 15,339 students who attended the sixteen vocational institutes in Singapore (4). Students in these institutions would have completed at least primary school education, and would be mainly in the age range of 14 to 20 years. Schools and junior colleges (5) formed the sampling frame for the second part of this survey, which was carried out in April 1987. The target population was the 430,160 students aged between 9 to 18 years studying in the Singapore public school system.

The results from these two surveys have been combined to present an overall picture of smoking among the school-going population in Singapore. The findings will be presented in a series of three consecutive articles.

Ministry of Health HQ
College of Medicine Building
College Road
Singapore 0316

Emmanuel S C, MBBS, MSc (PH), AM
Director
Research & Evaluation Department

C K Ho, BSc (Hons), MSc (Med Stats), FSS, MIS
Statistician
Research & Evaluation Department

A J Chen, MBBS, DPH, DTM & H, DCH, AM
Deputy Director of Medical Services (Primary Health Division)/
Assistant Director of Medical Services (Planning & Development
Division)

This first report covers the extent of smoking and the demographic characteristics of the young smokers and non-smokers, with particular reference to their sex, age, educational level and ethnic profile.

The second report will focus on the smokers and their smoking habit, assessing the effect of the family and home environment, as well as other factors which influence the young to take up smoking, and the age when they do so.

The final article will examine the views of young Singaporeans towards smoking and evaluate their knowledge on the harmful effects of smoking, appraising at the same time, the intentions of smokers and non-smokers as regards smoking in the future.

METHODOLOGY

The target population for the survey among the school-going population was all students aged between 9 and 20 years, studying in the state-run schools, junior colleges and vocational institutes in Singapore. This comprised approximately 446,000 students from Primary Four up to 'A' level, including those attending the BST or PVT, Technical, Business and Trade Certificate courses, in the vocational institutes.

A one-stage disproportionate stratified sample design was used for both components of the survey. In the vocational institutes, a 21% sample was randomly selected (equivalent to 3,200 trainees) whilst for the schools, 30,500 or 7% of the student population were randomly selected as respondents to the survey. The sample selection for the schools was carried out by the Ministry of Education (MOE) from its comprehensive computerised database of all students in public sector schools. Staff of the R & E Department worked in close consultation with officers from the MOE during this exercise. Painstaking efforts were taken to ensure that the characteristics of the students selected as respondents conformed very closely to that of the universe of school children.

Those in the late teens (ie 18 to 20 year olds) comprised only 3.9% of the final survey sample. There was thus a much lower representation of this group compared with their distribution in the population (33.2%)(6) as the majority of children in this age group would have finished with the normal school programme. The smoking levels in this age group from the survey cannot therefore be taken to represent the smoking levels of this age group in the population.

The disproportionate stratified sample design was selected so as to ensure that a sufficiently representative sample of students from vocational institutes would be included in the survey. These students comprise the less academically inclined of the school-going population and a disproportionate sampling of their numbers was carried out to ensure that the final sample surveyed truly reflected the educational heterogeneity of the school-going population. The findings for this survey were then adjusted to correspond to the profile characteristics of students in all schools and vocational institutes in Singapore (ratio of 28:1).

Anonymity and confidentiality were ensured throughout the survey. Fieldwork was coordinated by staff of the Research & Evaluation Department of the Ministry of Health. No trainer or teacher from the vocational institutes or schools was present during the completion of the

survey questionnaires. This was done to minimise any inhibition on the part of the students to provide frank responses to the questions asked.

Two sets of questionnaires were used in the survey. In addition to basic questions on smoking behaviour which were to be answered by all respondents, the "older" children, ie those aged 16 years and above, were probed in-depth about their knowledge and attitudes towards smoking. Those who smoked were also asked why they took up the habit, where and with whom they smoked, whilst ex-smokers were questioned about what motivated them to give up the habit.

All schools and vocational institutes selected consented to the participation of their students and trainees in the survey, with the exception of one school. The final response rate obtained for the survey was therefore 99%.

Statistical analyses carried out on the data included detecting any significant differences between the levels of smoking among the various socio-demographic subgroups, using the χ^2 test of significance.

RESULTS

Definitions pertaining to smoking for the survey have been adapted from a UICC Report Series(7).

A smoker was defined as an individual who, at the time of the survey, smoked at least one cigarette a week, continuously, for a period of at least two months.

A non-smoker was defined as one who had never tried smoking a cigarette before.

An experimental smoker referred to a respondent who reported smoking only a few puffs during a short period of time.

An ex-smoker was defined as one who used to smoke regularly but who was no longer smoking at the time of the survey.

The results from these two surveys showed that the majority (87%) of Singapore students had never smoked a cigarette before. The level of current smoking among the school-going population was 2%. The other children were either ex-smokers (2%), or just experimental smokers, who had never gone beyond their first few puffs (9%).

Sex

As expected, far more boys than girls smoked. Among the boys, an overall of 20% had experimented with smoking before, with 3% boys reported to be currently smoking. The figures for girls were much lower at 6% and 0.2% respectively. The difference in smoking levels between boys and girls was found to be highly significant ($p < 0.001$).

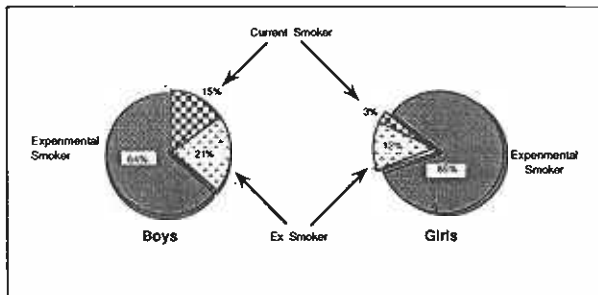
On probing into the smoking history of the students, it was found that among the respondents who had ever tried smoking before, 36% of the boys and 15% of girls went on to take up the habit seriously (Fig 1). The majority of these however, gave up after smoking regularly for some time. Only a small proportion carried on as current smokers when assessed at the time of the survey, comprising 15% of the boys and 3% of those girls who had tried smoking before.

Age

The practice of experimenting with smoking among

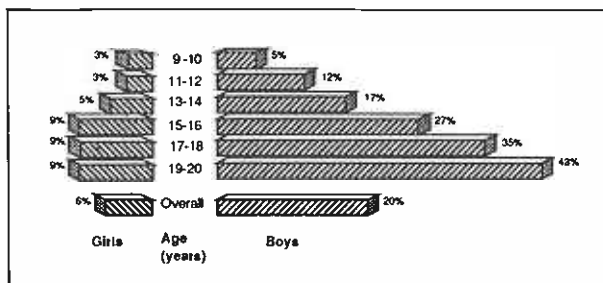
the school-going population, which was relevant in that it initiated children to the smoking habit, was found to be significantly correlated with age ($r=0.96$, $p<0.01$). Among the boys, 35% had already experimented with cigarettes by the time they were between 17 to 18 years of age compared with only 12% for boys aged between 11 to 12 years old (Fig 2).

Fig 1
Status of Respondents Who Had Ever Smoked, By Sex



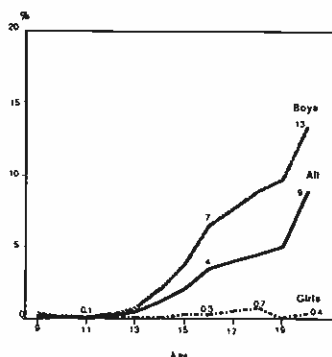
The levels of experimentation with smoking among girls were much lower than for boys, although the pattern of exposure being related to age, was seen similarly among the girls as with the boys. In all, 9% of girls aged 17-18 years had tried smoking before compared with 3% among those between 11 to 12 years old.

Fig 2
Respondents Who Had Tried Smoking By Age And Sex



A similar pattern of correlation with age emerged among current smokers; the proportion of boys who were currently smoking rose from 0.1% among those younger than 12 years old to 9% among boys aged 18 years, reaching a high of 13% among the 20 year olds (Fig 3).

Fig 3
Current Smokers By Age And Sex



The prevalence of regular smoking among girls was comparatively negligible. There were no female smokers between the ages of 9 to 13 years. Girls aged 14 years had the lowest smoking level of 0.05% rising to a high of 0.7% among 18 year olds. The median age of current smokers among the school-going population was therefore 16.3 years, with female smokers being slightly older (16.7 years) than male smokers (16.3 years).

Education

Whether smoking among Singapore's school-going population is correlated with educational aptitude is next examined, as this parameter has been shown in earlier studies to be associated with an individual's smoking status (2, 3, 8, 9).

Table 1
Percentage of Current Smokers by Education Level & Sex

Level	Boys	Girls
Total	3.0	0.2
Attained/Attending Primary + level education		
Level 1	3.0	-*
Level 2	2.1	0.2
Level 3	0.3	-
Attained/Attending Secondary @ level education		
Level 1	8.9	0.6
Level 2	2.0	0.1
Level 3	0.6	-
Attained/Attending Pre-University# level education		
Level 1	17.2	1.0
Level 2	6.8	0.1
Level 3	2.6	0.4

* indicates no observations

+ refers to students attending primary 4 to 8 levels in schools and those in vocational training who had passed the Primary Six Proficiency Examination.

@ refers to students attending secondary 1 to 5 levels in schools and those in vocational training who had passed the Secondary 'O' level (with below average grades) and 'N' level examinations.

refers to students attending arts or business courses in vocational institutes, pre-university schools and junior colleges.

Table 1 attempts to incorporate the two different education organisations included in the study, namely the schools and the vocational institutes, into one common categorisation for this analysis. The basis for this classification is the academic ability of students, using either entrance criteria into the vocational institutes, or

performance at the various national examinations for the schools. Level 1 includes students whose academic performance was the lowest in the various educational subgroups being referred to. Level 3 represents the students who performed best whilst Level 2 comprises children assessed to have intermediate academic ability. As an example, for those who had attained or were attending pre-university education, Level 1 refers to students in vocational institutes doing courses such as the Diploma in Applied Arts or the Certificate in Business Studies where the entry qualifications were 5 GCE 'O' Grades and 4 GCE 'N' Grades respectively. Level 2 refers to students in Pre-University Centres whilst Level 3 refers to those in Junior Colleges.

The survey findings show clearly that students with the best academic ability tended to have much lower smoking levels than the less academically inclined. This difference in the smoking rates seen in boys and girls of various academic abilities was found to be highly significant for every grade, from the Primary ($p < 0.001$), Secondary ($p < 0.001$) and the Pre-University ($p < 0.001$) levels.

This decreasing trend was also depicted among the girls of the various educational categories, though at a significantly lower level. There was one exception to this observation though. As seen among adult Singaporeans (2-3), this study has once again shown that the best academic performers among the older girls, namely those in the junior colleges, had a higher smoking level than the "intermediate academic" achievers in the same group. Once again also, it is seen that although the difference existed, the levels of smoking were low.

Ethnicity

Among the three major ethnic groups, Malay school children had the highest proportion of those who had tried smoking before (17%), and also had the highest current smoking prevalence rate (4%) - Table II.

Table II
Prevalence of Smoking By Ethnic Group

	Non Smokers	Experimental Smokers	Ex Smokers	Current Smokers
Total	87	9	2	2
Chinese	88	9	2	1
Malays	83	8	5	4
Indians	90	6	2	2

Chinese students had the lowest current smoking rates at 1% and also the highest proportion of experimental smokers, though this was by a marginal difference.

Indians registered the second highest smoking level, with 2% of them being current smokers. The differences in smoking levels between the ethnic groups was found to be highly significant ($p < 0.001$), although differences between the sexes in these groups did not show any significant result. These ethnic differences corroborate with ethnic-related findings on smoking among the adult

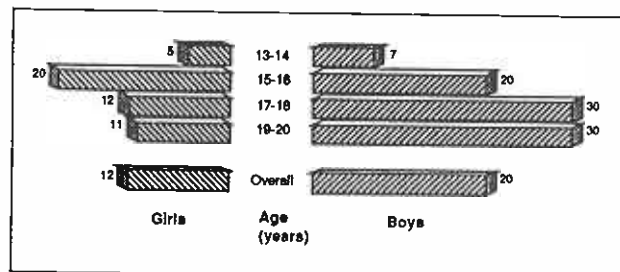
population of Singapore (2-3).

Number of Cigarettes Smoked

The median number of cigarettes smoked by current smokers in the school-going population was 20 cigarettes a week for boys, which is equivalent to about 2 to 3 cigarettes a day, and 12 cigarettes a week or 1 to 2 cigarettes a day, for girls. As further evidence, 34% of who boys who smoked, smoked more than 40 cigarettes a week compared with 18% among the girls. 34% of boys who smoked, more than 40 cigarettes a week compared with 18% among the girls.

Likewise, older children tended to smoke more than the younger ones; boys in their late teens (17-18 year olds) smoked a median number of 30 cigarettes a week whilst the younger boys (13-14 year olds) smoked a median of 7 cigarettes a week (Fig 4). This picture was seen among the girls as well, with the exception of the practice among the 15 - 16 year olds.

Fig 4
Median Number of Cigarettes Smoked By Sex
(Current Smokers Only)



AN INTERNATIONAL PERSPECTIVE

Table III compares the prevalence of smoking among the school-going population in Singapore, with that of school children in other countries. Only prevalence rates for specific ages are presented here, depending on the availability of data from the other countries. The similarity in these surveys is that only regular/current smokers have been taken into account for estimating the smoking prevalence rate. It can be clearly seen that the smoking prevalence among Singapore youths is significantly lower than that among children in the other countries, even when comparing the different age groups.

An interesting point to note here is that the prevalence of smoking among both boys and girls in the other countries have almost approximated each other, and what is even more alarming tended to show a higher prevalence of smoking among girls at the older ages. Singapore, on the other hand, still presents distinct differences in the smoking rates among girls and boys with the rise in smoking among older Singapore girls being almost insignificant by comparison.

Nearer home, when comparing the smoking status between 16 year olds in Malaysia (13) and Singapore, it can be seen quite clearly that the smoking levels are much lower in Singapore compared with what is seen among Malaysian school children (Table IV). The proportion who said they had never tried smoking a cigarette before was also higher among Singaporean 16 year olds, for both sexes.

Table III
Prevalence of Smoking in School Children in Different Countries

Country (year)	Sex	Age (years)								
		11	12	13	14	15	16	17	18	19
Singapore 1987	M	0.1	0.3	0.7	2.1	3.9	6.6	7.7	8.9	9.7
	F	0	0	0	0	0.3	0.3	0.6	0.7	0.1
Australia(10) 1987	M	NA	10	17	24	29	29	27	NA	NA
	F	NA	8	18	29	34	34	30	NA	NA
England & Wales(11) 1984	M	0	2	10	16	28	29	NA	NA	NA
	F	1	2	9	19	28	30	NA	NA	NA
Scotland(11) 1984	M	4	8	10	22	29	0	NA	NA	NA
	F	3	3	12	22	34	0	NA	NA	NA
S. Africa(12) 1983	M	0	0	8	9	19	29	31	39	20
	F	0	11	11	13	20	39	28	37	0

'NA' indicates Not-Available.

Nearer home, when comparing the smoking status between 16 year olds in Malaysia (13) and Singapore, it can be seen quite clearly that the smoking levels are much lower in Singapore compared with what is seen among Malaysian school children (Table IV). The proportion who said they had never tried smoking a cigarette before was also higher among Singaporean 16 year olds, for both sexes.

Table IV
Smoking Status of 16 Year Old School Children+ in Singapore and Malaysia

Country	Sex	Non-Smokers	Experimental & Ex Smokers*		Current Smokers
			Experimental	Ex Smokers*	
Malaysia	M	51	32	17	17
	F	84	14	2	2
Singapore	M	69	24	7	7
	F	90	10	0.3	0.3

+ In Singapore, this refers to both school children and vocational trainees

* The Malaysian study did not differentiate between experimental and ex-smokers. Hence these two categories for Singapore have been combined for meaningful comparison.

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DISCUSSION

What has been lacking so far with regard to smoking programmes in Singapore has been information on young smokers. Results obtained from this first ever national survey on smoking among the school-going population in Singapore show that smoking among Singapore school children is low. It is not surprising that the socio-demographic characteristics of smokers resembles that of their adult counterparts, being more prevalent among Malays, males, the older respondents, and the less academically inclined.

The smoking prevalence among the school-going population in Singapore, when compared internationally, is still relatively low. However, a sizeable proportion of boys (20%) and to a lesser extent girls (6%), have experimented with smoking before. Admittedly, the proportion of experimenters who eventually went on to take up the habit seriously was a third (36%) among boys or much less (15%) among girls.

More needs to be done in the area of health education using, perhaps, campaigns directed at those groups of school children, identified from this study to have the highest smoking prevalence. The aims of these programmes should be targeted at reducing the numbers and proportions of the school aged population who experiment with smoking, as these are vulnerable groups, who may go on to become regular smokers.

The next article, which will feature the results of the analysis on the development of the smoking practice among smokers of school-going age in Singapore, should provide valuable information for understanding how the smoking habit becomes established. This would be a useful tool for the planning and implementation of prevention programmes in the country for this important group in the population.

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