



Cigarette smoking, pocket money and socioeconomic status: results from a national survey of 4th form students in 2000

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Abstract

Aims To investigate whether pocket money amount and socio-economic status are risk factors for smoking in 14 and 15 year old children.

Methods This was a national cross-sectional survey of 4th form students who answered an anonymous self-administered questionnaire in November 2000. Socio-economic status was determined from the Ministry of Education school socio-economic deciles.

Results Questionnaires from 14793 girls and 14577 boys were analysed. Socioeconomic status (SES) was inversely associated with smoking prevalence in girls only ($p < 0.0001$). Students in low SES decile schools received greater amounts of pocket money than those in high SES decile schools ($p < 0.0001$). Compared with students who received \$1-10 in the last 30 days, for students receiving pocket money $> \$30$, \$21-30, or \$11-20, the adjusted relative risks for smoking \geq monthly were 1.73 (95% CI 1.61, 1.85), 1.48 (1.35, 1.62), and 1.15 (1.03, 1.28) in girls, and 1.57 (1.46, 1.70), 1.32 (1.19, 1.46), and 1.11 (1.00, 1.23) in boys, respectively. The proportion of smokers purchasing cigarettes increased with amount of pocket money received in the last 30 days ($p < 0.0001$).

Conclusions Cigarette smoking is positively related to pocket money amount in adolescents. This finding has important public health significance, but further research is required to determine if the association is causal.

Tobacco smoking remains the major preventable public health issue for New Zealand at the beginning of the 21st century. Previous surveys of 4th form students carried out in the 1990s indicated that the proportion of adolescents smoking daily increased by more than a third from the early 1990s to 1997,^{1,2} although data for 1999 indicate that cigarette smoking may be declining in girls but not in boys.³ The factors currently involved in determining why adolescents become smokers will continue in many cases to adversely affect their health status well into the middle of this century.

A number of risk factors for adolescent smoking have been identified. These include unmodifiable factors, such as female gender, Maori ethnicity and low school socio-economic decile, and modifiable risk factors such as parental smoking, adolescent watching of televised (tobacco sponsored) sports programmes, and the opinion that smoking is not harmful to health.^{1,4} Tobacco sponsorship has been outlawed since 1995. However, the population attributable risks associated with the remaining two modifiable variables, 23% for parental smoking and 7% for believing that smoking is not harmful to health,⁴ indicate that other modifiable factors associated with the adolescent smoking need to be identified if successful prevention strategies are to be developed.

Previous international studies suggest that the availability of money is a risk factor for adolescent smoking. Positive associations between pocket money and smoking have been reported from a survey of 10-11 and 13-14 year old children in Barcelona,⁵ and from a national survey of French children aged 12-18 years.⁶ In the latter survey, the association was independent of socioeconomic status. An Australian study of schools in south-western and central Sydney, where there is a large concentration of Middle-Eastern and Asian students, reported that students with more than \$20 per week pocket money were 55% more likely to be smokers than students with less pocket money.⁷

There appear to be no previous New Zealand surveys of pocket money and adolescent smoking. The purpose of the current report is to investigate whether the availability of pocket money and socio-economic status are risk factors for smoking in a national survey of 4th Form students.

Methods

National surveys of tobacco smoking and purchasing by fourth-form students were carried out in November of 1992, 1997, 1998 and 1999. Details of previous surveys have been reported.^{1,3,4} A further survey was carried out in November 2000. All New Zealand schools with 4th form students were invited to participate. The school response rate was 72% (327 out of 455 approached). Students anonymously answered a one page questionnaire on age, sex, ethnicity (self-assigned), smoking behaviour (frequency of smoking, quantity of cigarettes per week, preferred brand(s) of cigarettes, and source and accessibility of cigarettes). Students were also asked how much pocket money they received in a usual month (30 days). The Ministry of Education classification of schools by socio-economic decile (from the low of 1 to high of 10) was used to code students for socioeconomic status (SES).⁸ Consent for the survey was obtained from school principals in place of parents. The Ministry of Health Auckland Ethics Committee gave permission to survey without formal referral to their committee.

Schools returned questionnaires from 31652 students out of 45536 on school rolls (70% student response). Analyses were restricted to 14 and 15 year olds, and to those with known sex, ethnicity and smoking status. Excluded were students of: age 13 years (n=245) or 16 years (423) or unknown (176); unknown sex (93); unknown ethnicity (889); and smoking status unknown (456); leaving questionnaires from 29370 for analyses.

All statistical analyses were made using SUDAAN (Release 7.5.6, 2000) which corrects standard errors and confidence intervals for any design effect from clustering of students by school. Unconditional logistic regression and logit models for ordinal and nominal outcomes were used to estimate adjusted odds ratios, which were converted to relative risks.⁹ In ethnic comparisons, "Other" students (n=377) have been combined with European. The population attributable risk was calculated by estimating the attributable proportion for the exposed cases within each exposure category using standard methods.¹⁰

Results

The sample comprised 14793 girls (Maori 2488, Pacific Islands 793, Asian 965, European/Other 10547) and 14577 boys (Maori 2212, Pacific Islands 892, Asian 1112, European/Other 10361). Smoking daily or more varied with ethnicity, in girls being Maori 37.1%, Pacific 19.4%, Asian 5.1% and European/Other 12.2%, and in boys being Maori 24.2%, Pacific 16.8%, Asian 9.4% and European/Other 12.2%. The ethnic-specific proportions for smoking monthly or more, in girls were Maori 51.1%, Pacific 31.3%, Asian 9.0% and European/Other 28.8%, and in boys were Maori 33.8%, Pacific 25.8%, Asian 14.6% and European/Other 23.4%.

Table 1 shows the distribution of smoking category by school SES decile and sex. Daily smoking varied inversely with school SES decile, the variation from deciles 1 and 2 combined to deciles 9 and 10 combined being 26.7% to 8.0% for girls (p<0.0001) and 17.6% to 12.3% for boys (p<0.0001). In contrast, the variation from the bottom two deciles to the top two deciles in the proportion of students smoking

\geq monthly was significant for girls (from 39.6% to 22.9%, $p < 0.0001$) but not for boys (from 24.6% to 24.2%, $p = 0.18$).

Table 1. Distribution of smoking status by sex and school socio-economic decile.

Smoking Category	School Socio-economic Decile				
	1 & 2 (low)	3 & 4	5 & 6	7 & 8	9 & 10 (high)
Girls					
(n)	(1153)	(2418)	(3689)	(3621)	(3821)
Smoker					
Daily	26.7%	22.3%	19.3%	14.9%	8.0%
Weekly	7.0%	7.9%	7.6%	8.7%	6.7%
Monthly	5.9%	6.0%	7.0%	8.6%	8.2%
Less often	14.8%	12.5%	12.9%	14.5%	14.6%
Total \geq monthly	39.6%	36.1%	33.9%	32.2%	22.9%
Non-smoker					
Previous smoker	22.1%	25.4%	24.8%	22.5%	21.8%
Never smoked	23.4%	26.1%	28.4%	30.9%	40.7%
Boys					
(n)	(1066)	(2814)	(3234)	(4123)	(3259)
Smoker					
Daily	17.6%	16.1%	14.9%	12.6%	12.3%
Weekly	3.6%	4.3%	5.7%	5.0%	5.4%
Monthly	3.4%	4.4%	5.1%	5.7%	6.4%
Less often	12.0%	13.2%	13.7%	13.3%	12.9%
Total \geq monthly	24.6%	24.8%	25.7%	23.3%	24.2%
Non-smoker					
Previous smoker	31.4%	28.8%	28.5%	28.3%	24.2%
Never smoked	32.0%	33.3%	32.1%	35.2%	38.7%

Table 2 shows the association between the amount of pocket money each student received in the last 30 days and demographic variables (percentages in the table sum across rows). In univariate analyses, pocket money was not related to sex ($p = 0.7$), but 15 year-old students were more likely to have received more than \$30 in the last 30 days than 14 year olds ($p < 0.0001$). With regard to ethnicity, Maori students received the greatest amount of pocket money, followed in order by European/Other, Asian and Pacific ($p < 0.0001$). Surprisingly, students in low SES decile schools received greater amounts of pocket money than those in high SES decile schools ($p = 0.02$). However, in multivariate analyses using proportional odds models with a cumulative logit link for ordinal responses, which adjusted for other variables in Table 2, only age and ethnicity continued to be associated with the amount of pocket money received ($p < 0.0001$). In contrast, school SES decile was no longer associated with pocket money amount after adjusting for age, ethnicity and sex ($p = 0.5$).

The distribution of smoking status by amount of pocket money received in the last 30 days is shown for in Table 3 for girls and boys separately, since there was a significant interaction ($p < 0.05$) between sex and pocket money on smoking prevalence. In separate generalised multinomial logit models for girls and boys, smoking rates increased with increasing pocket money ($p < 0.0001$), but this increase was more marked for girls. As pocket money increased from \$10 dollars or less to \$30 dollars or more, the percentage of girls smoking at least monthly increased from 20.9% to 38.5%, whereas the corresponding increase for boys was 18.0% from to 29.3%.

Table 2. Distribution in pocket money (dollars) per month among demographic subgroups.

Demographic Group (n)	Pocket Money (\$/month)				P-value	
	0-10	11-20	21-30	>30	Uni-variate	Multi-variate
Sex						
Female (14,463)	24.6%*	15.0%	13.6%	46.8%	0.74	0.9
Male (14,141)	24.9%	15.3%	13.3%	46.6%		
Age						
14 years (13,109)	25.4%	15.9%	13.8%	44.9%	<0.0001	<0.0001
15 years (15,495)	24.2%	14.5%	13.1%	48.2%		
Ethnicity						
Maori (4,504)	16.3%	13.5%	13.5%	56.8%	<0.0001	<0.0001
Pacific (1,600)	27.4%	16.6%	14.7%	41.3%		
Asian (2,031)	31.1%	15.2%	11.3%	42.4%		
European (20,469)	25.8%	15.4%	13.5%	45.3%		
School SES decile						
1 & 2 (2,109)	20.8%	14.9%	12.9%	51.4%	0.02	0.5
3 & 4 (5,067)	23.1%	15.5%	13.9%	47.5%		
5 & 6 (6,725)	24.3%	15.3%	13.4%	47.0%		
7 & 8 (7,556)	25.2%	15.3%	13.2%	46.3%		
9 & 10 (6,977)	27.0%	14.7%	13.4%	44.9%		

Percentages sum to 100% across rows.

Table 3. Distribution of smoking status by pocket money (dollars) in the last month (30 days), all students (male and female) in 2000 4th form survey.

Smoking Category	Pocket money (\$/month)			
	0-10	11-20	21-30	>30
Girls				
Smoker				
Daily	9.7%	12.1%	16.6%	21.0%
Weekly	5.3%	6.5%	7.6%	9.2%
Monthly	5.9%	6.7%	8.3%	8.3%
Less Often	12.6%	11.6%	13.8%	15.1%
Total \geq Monthly	20.9%	25.3%	32.5%	38.5%
Non-smoker				
Previous smoker	23.8%	23.6%	23.3%	22.9%
Never smoked	42.7%	39.5%	30.4%	23.5%
(n)	3553	2175	1963	6772
Boys				
Smoker				
Daily	9.9%	10.8%	12.5%	17.6%
Weekly	3.9%	4.3%	6.1%	5.6%
Monthly	4.2%	5.1%	5.7%	6.1%
Less Often	12.3%	13.6%	13.4%	13.6%
Total \geq Monthly	18.0%	20.2%	24.3%	29.3%
Non-smoker				
Previous smoker	26.8%	26.0%	27.7%	28.5%
Never smoked	42.9%	40.2%	34.6%	28.6%
(n)	3524	2158	1873	6586

Table 4 shows relative risks of daily smoking and \geq monthly smoking associated with various demographic variables, controlling for each other. Both smoking measures were related to the amount of pocket money in each sex. Compared with students who

received \$0-10 in the last 30 days, those receiving >\$30 were 89% more likely to smoke daily and 73% more likely to smoke \geq monthly among girls, and 68% more likely to smoke daily and 57% more likely to smoke \geq monthly among boys. Smoking daily or \geq monthly were also related to older age and ethnicity (Maori highest risk, Asian lowest risk) in each sex. However, school SES decile was inversely associated with smoking in girls only, with deciles 1 and 2 combined being 97% more likely to smoke daily, and 31% more likely to smoke \geq monthly, than deciles 9 and 10 combined. In contrast, for boys, school SES decile was not related to either daily or \geq monthly smoking.

Among smokers, the amount of pocket money in the last 30 days was related to their source of cigarettes. For the four pocket money categories - \$0-10, \$11-20, \$21-30, >\$30 in last 30 days - the proportions of smokers who bought their own cigarettes were, respectively, 22.1%, 24.4%, 27.6% and 35.1% ($p < 0.0001$). The proportion of smokers who received cigarettes from a family member (parent and/or sibling) also increased with increasing amount of pocket money, being 24.2%, 25.7%, 27.1% and 29.2% ($p < 0.0001$) for the above four pocket money categories, respectively. In contrast, the use of friends as a source was lowest for those receiving >\$30 pocket money, compared with students receiving \$0-10 in the last 30 days (60.5% v 64.5%, $p < 0.0001$).

The proportion of students smoking monthly or more often, that could be attributed to receiving more than \$10 pocket money in the last 30 days, was calculated using the adjusted sex-specific relative risks in Table 4 and the sex-specific number of students smoking \geq monthly for each pocket money category (derived from Table 3). The attributable proportion was 30.4% (1378/4537) for girls and 24.7% (854/3455) for boys.

Discussion

The results of this national survey of fourth form students indicate a positive association between the amount of pocket money and risk of cigarette smoking in both sexes, independently of socio-economic status.

These findings do not appear to have been reported before in New Zealand adolescents, but confirm previous studies in Spain, France and Australia.⁵⁻⁷ The observation of the high proportion of students in SES deciles 1 and 2 who received >\$30 pocket money in the last 30 days was unexpected (Table 2). The positive association between the amount of pocket money and smoking prevalence was consistent in both sexes, and showed a dose response relationship (Table 4). The possibility of this association being causal is supported by the observation among smokers that students receiving >\$30 pocket money in the last 30 days were most likely to self-purchase cigarettes and were least reliant on their friends for obtaining cigarettes.

The finding that the association between smoking and amount of pocket money was independent of socio-economic status (Table 4) indicates that other factors underlie this association. A key factor appears to be parental attitudes and behaviour towards smoking. The association between family as a source of cigarettes and amount of pocket money received by adolescent smokers shows the link in parental behaviour regarding the provision of both pocket money and cigarettes to adolescents. Not only are parents the primary source of pocket money, but previous research also indicates that parental smoking is a risk factor for adolescent smoking.³

Table 4. Relative risk (95% confidence intervals) of daily smoking and smoking \geq monthly, by demographic variables and amount of pocket money (dollars) in the last month (30 days); each variable adjusted for all other variables in the table - students in 2000 4th form survey.

Variable	Relative Risk (95% CI)*	
	Daily Smoking	\geq Monthly Smoking
<i>Girls</i>		
Age		
14 years	1.00	1.00
15 years	1.13 (1.05, 1.22)	1.11 (1.05, 1.17)
Ethnicity		
Maori	2.65 (2.44, 2.88)	1.66 (1.56, 1.76)
Pacific	1.47 (1.20, 1.79)	1.06 (0.90, 1.23)
Asian	0.46 (0.34, 0.62)	0.32 (0.25, 0.41)
European	1.00	1.00
School SES decile		
1 & 2 (low)	1.97 (1.52, 2.52)	1.31 (1.12, 1.52)
3 & 4	2.02 (1.59, 2.55)	1.32 (1.15, 1.50)
5 & 6	1.94 (1.54, 2.41)	1.30 (1.15, 1.45)
7 & 8	1.66 (1.33, 2.06)	1.30 (1.16, 1.44)
9 & 10 (high)	1.00	1.00
Pocket money (\$/month)		
0-10	1.00	1.00
11-20	1.12 (0.96, 1.31)	1.15 (1.03, 1.28)
21-30	1.54 (1.33, 1.78)	1.48 (1.35, 1.62)
>30	1.89 (1.68, 2.11)	1.73 (1.61, 1.85)
<i>Boys</i>		
Age		
14 years	1.00	1.00
15 years	1.20 (1.10, 1.30)	1.16 (1.09, 1.23)
Ethnicity		
Maori	1.91 (1.71, 2.11)	1.44 (1.32, 1.57)
Pacific	1.39 (1.18, 1.63)	1.16 (1.00, 1.34)
Asian	0.78 (0.61, 1.00)	0.61 (0.51, 0.74)
European	1.00	1.00
School SES decile		
1 & 2 (low)	0.99 (0.76, 1.30)	0.91 (0.76, 1.07)
3 & 4	1.07 (0.86, 1.32)	0.98 (0.82, 1.15)
5 & 6	1.07 (0.86, 1.33)	0.91 (0.75, 1.07)
7 & 8	0.96 (0.77, 1.18)	0.79 (0.63, 0.98)
9 & 10 (high)	1.00	1.00
Pocket money (\$/month)		
0-10	1.00	1.00
11-20	1.05 (0.91, 1.23)	1.11 (1.00, 1.23)
21-30	1.21 (1.03, 1.41)	1.32 (1.19, 1.46)
>30	1.68 (1.50, 1.88)	1.57 (1.46, 1.70)

*Calculated from odds ratios estimated by logistic regression.

Since this is a cross-sectional study, the associations reported do not prove causation. It is possible that the amount of pocket money received by students is a marker of other attitudinal changes occurring during adolescence that are the primary determinants for choosing to smoke. Moreover, we did not ask about money earned outside the home, which some students may not have counted when reporting their pocket money. Further research is required to clarify this. However, if the association is causal, the calculation that 30% of female, and 25% of male, adolescent smoking can be attributed to receiving more than \$10 per month pocket money suggests that

developing parental strategies around the allocation of pocket money may have major benefits in limiting adolescent smoking.

In contrast with the findings for pocket money, the association between school SES decile and smoking prevalence showed a different pattern. Both daily smoking and smoking \geq monthly were inversely associated with SES decile in girls only (Table 4). In boys, daily smoking was unrelated, while \geq monthly smoking was positively related, to SES decile (Table 4). Our measure of socio-economic status, based on a single aggregate value for each school, is not ideal for classifying students individually. However, it seems unlikely that any measurement error arising from using school SES deciles can explain these inconsistent results between sexes. Rather, more plausible conclusions are that socio-economic status has greater importance as a risk factor among girls than boys, or that there are other unmeasured confounders related to socio-economic status in girls but not boys.

In summary, we have found that cigarette smoking is positively related to pocket money amount in adolescents, independent of socio-economic status. This finding may have important public health significance, but further research is required to determine if the association is causal. If it is, then media campaigns have a key role to alert families that controlling the money supply to adolescents could slow their progression of smoking. The key role of tobacco taxation in keeping the price of cigarettes high, beyond the affordability of adolescents is clear, but needs to be complemented by publicity campaigns to inform families that pocket money may be going up in smoke.

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