



Smoking behaviour and expectations among Auckland adolescents

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Abstract

Aim To compare the relationships of age level, gender, smoking status and ethnicity with Form Two and Form Six students' beliefs about smoking and their familial smoking behaviour.

Methods A stratified sample of 3041 Form Two and Form Six students from schools in the Auckland region was surveyed. Smoking prevalence, frequency, parental smoking and smoking inside the home were assessed using a 60-item questionnaire.

Results Analyses revealed several important differences across and within the Form Two and Form Six data relating to ever smoking, daily smoking and expectations of smoking in the future. Specifically, Form Six students were more likely to be ever smokers, daily smokers and have higher expectations of smoking in the future ($p < 0.001$). Asian students reported a consistently lower propensity to smoke and hold expectations of smoking in the future compared with other ethnic groups. Students from higher-decile-rank schools were more likely to be ever smokers, daily smokers and have positive smoking expectations for the future; ($p < 0.001$, $p < 0.01$, $p < 0.001$). Significant differences in familial smoking acceptability were observed across all measures.

Conclusions The critical age differences were: (1) higher rates of ever smoking; (2) higher rates of daily smoking; and (3) higher levels of smoking expectations in Form Six compared with Form Two. Evidence from this study suggests that by Form Two a proportion of adolescents have already experimented with tobacco and some are daily smokers. Future research should continue to monitor the beliefs and behaviour of young adolescents and older teenagers who are at critical stages for the initiation and establishment of smoking behaviour. In addition, New Zealand's tobacco-control agenda should continue to support adult-focused programmes that reduce the acceptability and visibility of smoking.

Smoking uptake during adolescence continues to present a perplexing public health issue in New Zealand. Despite the impact of public health initiatives aimed at reducing smoking uptake and increasing quit rates among adults, a resistant core of adolescents continue to smoke. Research testifies that over the past decade there have been important changes in the epidemiology of adolescent smoking; specifically, the ages at first uptake and at establishment of persistent smoking behaviour have, over time, decreased.¹ Smoking experimentation remains a consistent characteristic of adolescence, and as the child moves through the period of adolescence the likelihood of smoking increases. Some of this behaviour can be explained in terms of the social, cognitive and physical developmental changes that typically occur between the ages of 12 and 16 years.^{2,3}

To date there are few New Zealand studies that compare the smoking behaviour, expectations, and familial smoking behaviour of Form Two (mean age 12 years) and Form Six (mean age 16 years) students. Adolescents from these two age groups were assessed in the present study for the following reasons. As the age of smoking onset continues to decrease, the pre-adolescent years are now widely accepted as a critical stage in the development of formative smoking behaviour.^{1,2} Similarly, the mid-teen years are also critical in terms of establishing persistent smoking behaviours. Previous studies of adolescent smoking in New Zealand, published⁴ and unpublished (Bandranayake and McCool, 1997, unpublished data), have predominantly addressed the smoking behaviour of Form Four students. Although these studies offer a valuable tool for monitoring trends in adolescent smoking, we are currently lacking information on smoking initiation during the early adolescent years. This information is critical for the development of effective initiatives aimed at reducing smoking uptake among young people.

Methods

Sample A stratified sampling strategy was used to obtain two representative samples of Auckland Form Two and Form Six students. The combined sample was stratified according to school decile rank, gender and ethnicity, which are factors widely accepted to be important predictors of current and future smoking.^{1,2} As a result, a two-stage sampling procedure was undertaken. Two secondary and three primary or intermediate schools from each of the ten decile ranks (1–10) were randomly selected and invited to participate in the survey. In total, 10 secondary schools and 15 primary or intermediate schools participated in the study. Two primary schools declined to participate on the grounds that the timing of the study was inconvenient. Primary and intermediate schools were over-invited in order to ensure that a comparable number of students as from secondary schools would be included in the study. Not all schools that agreed to participate were included in the survey due to the high response rate. Schools that had not arranged a date for the survey to be undertaken at the stage of sample saturation were not included in the final sample. In total, 68% of intermediate and primary schools and 76% of secondary schools selected took part in the survey.

Sample profile Of the total sample, 48% of students (n = 1464) were from Form Two classes and 51.8% (n = 1576) were from Form Six. The median age of Form Two students was 12 years; within the Form Six sample the median age was 16 years. In the majority of cases students opted to identify with one ethnic group (2793, 92%); a smaller proportion identified with two (215, 7%) or more (11, 0.4%) ethnic groups. Twenty two (0.7%) students did not identify with any nominated ethnic group.

Procedure The survey was conducted early in the first school term (February 2000). Participation in the survey required passive consent, which enabled parents to provide input on the study if desired whilst preserving the representativeness of the sample and integrity of the study. All students were granted consent to participate in the survey. The principal researcher distributed the questionnaires to students during class time or school assembly and was present during the completion of the questionnaires. All schools were surveyed within a two-month period. Student attendance rates on the days of the survey were not formally collected. However, the principal researcher emphasized to each school liaison staff member the importance of selecting a survey date on which the majority of students would be present at school (ie, avoiding school extra-curricular events, work experience etc).

Measures The smoking-behaviour and parental-smoking items were developed from standardized smoking-behaviour questions in previous studies assessing the current and susceptible smoking status of a population (Bandranayake and McCool, 1997, unpublished data).^{2,4} Smoking behaviour was assessed with the item 'Have you ever smoked a cigarette?' (1 = yes, 2 = no). Daily smoking was assessed through the item 'How often do you smoke now?' (five-point scale: 1 = at least once a day, 5 = never). A separate variable for daily smoking was subsequently created where 1 = daily smoker and 0 = non-daily smoker.

Smoking expectations were assessed using the item 'How likely is it that you will smoke a cigarette in the next year?' (five-point scale: 1 = yes, definitely, 5 = definitely not). Items were re-coded to create a dichotomous variable where 1 = low smoking expectations and 0 = high smoking expectations. Results of the analyses of this outcome variable were unaffected by changing from a continuous to a

dichotomous variable. The dichotomous variable was created by combining responses so that 'probably not' and 'definitely no' = 0, and 'probably yes' and 'definitely yes' = 1.

Parental smoking behaviour was assessed with the item 'Do either of your parents smoke?' (1 = yes, 2 = no). Smoking inside the home was assessed with the item 'Do people smoke inside your house?' (1 = yes, 2 = no, 3 = sometimes). Smoking inside was subsequently re-coded to create a dichotomous variable for analysis (eg, smoking permitted inside home (yes or sometimes = 1, no = 0)).

Logistic regression analyses were used to assess age, gender, smoking status, and ethnicity differences in tobacco use, daily smoking, parental smoking, and smoking inside the home. Across each measure interaction effects were assessed between age level (Form) and the other independent variables. Where an interaction effect was observed for age level the groups were assessed independently. Through analysing the samples independently, comparisons between the Form Two and Form Six samples, across the range of outcome measures, were assessed.

Results

Analyses were conducted to assess the effect of age level, gender, ethnicity, smoking status, school decile rank, parental smoking and smoking inside on ever-smoking status, daily smoking and smoking expectations for the future. Where an interaction effect was observed between Form and gender, ethnic group, decile rank, parental smoking or smoking inside the home, the two Forms were assessed independently. Table 1 presents the data from the logistic regression analyses for each outcome measure. Where an interaction effect was identified further analyses to explain the result of these effects are also presented. Throughout the study a significance level of 0.01 was assumed to control for Type 1 errors.

Ever smoker Table 1 presents data from the logistic regression analyses for independent variables on ever-smoker status. Consistent with expectation, Form Six students (64.4%) were more likely to report having smoked in the past compared with Form Two students (28.8%). As an interaction effect was observed between Form and gender (OR = 1.1, 95% CI 1.0–1.2, $p < 0.01$), the two age groups were subsequently assessed independently. A difference in reports of ever-smoking behaviour was identified between boys and girls within the Form Two sample, with more boys (13.6%) smoking than girls (10.3%), which approached statistical significance, $p < 0.05$. When the Form Six sample was assessed, the observed difference between male (36%) and female (37%) ever-smoking behaviour was not statistically significant. Across the total sample, a significant difference between ethnic groups was also identified, with Asian students reporting lower ever-smoking rates compared with all other ethnic groups. This pattern was also observed when the groups were assessed separately. Fewer Form Two Asian students (2.4%) reported having tried a cigarette in the past compared with Pakeha/European (13.3%), Maori (20.6%), Pacific (15.2%) and other ethnic groups (7.1%). Within the Form Six sample, fewer Asian students (21.4%) were ever smokers compared with Pakeha/European (43.9%), Maori (44.1%), Pacific (33.4%), and students from other ethnic groups (28.7%).

School decile rank was also found to be significantly associated with ever-smoking behaviour, with students from higher-decile schools more likely to report having smoked in the past (28%) compared with those from lower-decile schools (23%). Parental smoking status was also associated with ever-smoking behaviour. Students who reported that their parents were smokers (31%) were more likely to have smoked in the past compared with those who did not (21%). Similarly, students who reported that smoking was permitted inside their home (38.3%) were more likely to be ever smokers than those who did not (60%).

Table 1. Smoking behaviour and expectations among Form Two and Form Six students

Smoking behaviour	Form Two			Form Six		
	Male (n = 772)	Female (n = 688)	Total (n = 1460)	Male (n = 908)	Female (n = 663)	Total (n = 1571)
Ever smoker	30.8%	26.6%	28.8%	62%	65.6%	66.4%
Frequency						
At least once a day*	5.3%	2.5%	4.0%	10.5%	16.3%	16.0%
Once a week*	2.8%	1.2%	2.0%	6.6%	7.1%	6.8%
Monthly*	1.3%	1.6%	1.4%	4.2%	4.8%	4.4%
Less often*	4.1%	5.1%	4.6%	10.5%	9.7%	10.2%
Not at all	83.3%	87.8%	85.3%	62.3%	59.6%	61.2%
Missing values	3.2%	1.8%	2.7%	5.9%	2.5%	1.4%
Try cigarette in next year[†]	2.4 (1.2)	2.3 (1.0)	2.3 (1.1)	3.0 (1.3)	2.9 (1.4)	2.9 (1.3)
Become a smoker in future[†]	2.2 (1.0)	2.1 (.87)	2.1 (.97)	2.4 (1.0)	2.4 (1.1)	2.4 (1.1)

*among smokers; [†]mean (SD). NB: Data for ten students missing.

Daily smoking Table 2 presents data from the logistic regression analyses for independent variables on daily smoking behaviour. Daily smoking rates were significantly higher among Form Six (10.2%) than Form Two students (4.6%). Contrary to expectation, a significant effect for gender was not detected within either the Form Two or Form Six samples. A significant difference in daily smoking rates was observed, with Asian students (3.8%) significantly less likely to report being a current smoker compared with Pakeha/European (8.4%), Maori (5.6%), Pacific (8.6%), and students from other ethnic groups (7.3%).

Table 2. Summary of logistic regression analyses for daily smoking

	Beta	SE	Wald Statistic	df	p value	Odds ratio	95% CI
Form	0.931	0.155	35.977	1	0.000	2.50	1.8–3.4
Gender	0.155	0.150	1.088	1	0.297	1.10	0.87–1.5
Decile rank	0.488	0.154	9.984	1	0.002	1.60	1.2–2.3
Parent smokes	-0.060	0.162	0.136	1	0.713	0.94	0.68–1.2
Smoke inside	-0.313	0.187	2.806	1	0.094	0.74	0.50–1.0
Maori	-0.141	0.216	0.429	1	0.513	0.86	0.56–1.3
Pacific	-0.044	0.193	0.052	1	0.819	0.95	0.65–1.3
Asian	0.772	0.241	10.233	1	0.001	2.10	1.3–3.4
Other	0.019	0.303	0.004	1	0.951	1.00	0.56–1.8
Constant	4.319	1.066	16.416	1	0.000	0.01	

A significant main effect was noted for school decile rank, whereby students from a higher-decile-rank school were more likely to be daily smokers. When the two groups were assessed independently, this effect was consistent for the Form Two sample (OR = 2.2, 95% CI 1.2–3.9, $p < 0.01$) but was not evident within the Form Six sample. An interaction effect was also identified between form and smoking inside the home (OR

= 2.5, 95% CI 1.1–5.4, $p < 0.01$); therefore, the groups were assessed independently. Although a significant main effect was observed within the Form Two sample ($p < 0.01$), no significant main effect was identified for the Form Six sample. Accordingly, students who reported that smoking was permitted in their home were more likely to be daily smokers than those who did not.

Smoking expectations Table 3 presents data from the logistic regression analyses for independent variables on students' expectations of smoking in the future. A significant main effect for age level was observed, with 36.5% of Form Six students compared with 17% of Form Two students reporting they anticipated being a smoker in the future. Significant differences in expectations of smoking in the future were also identified between all ethnic groups. Specifically, fewer Asian students (12%) expected to be smokers in the future compared with Pakeha/European (33%), Maori (34%), Pacific (26%) and students from other ethnic groups (17.4%).

Students who reported higher smoking expectations for the future were more likely to belong to higher-decile schools (52.7%, $p < 0.001$). When the groups were assessed independently, this pattern of effect was consistent for the Form Two students (65%) (OR = 2.1, 95% CI 1.5–2.8, $p < 0.001$), but was not evident within the Form Six sample (47%). Having a parent who smokes was also found to be associated with positive smoking expectations, $p < 0.01$. This effect was found within the Form Six sample (OR = 0.67, 95% CI 0.52–0.86, $p < 0.01$), but not within the Form Two sample. In addition, students who reported that smoking was permitted in their home (18%) were more likely to have positive smoking expectations for the future than those who did not (80%, $p < 0.001$).

Table 3. Summary of logistic regression analyses for smoking expectations

	Beta	SE	Wald Statistic	df	p value	Odds ratio	95% CI
Form	1.201	0.094	164.711	1	0.000	3.30	2.7–3.9
Gender	-0.047	0.093	0.251	1	0.616	0.95	0.79–1.1
Decile rank	0.413	0.095	18.897	1	0.000	1.50	1.2–1.8
Parent smokes	-0.302	0.099	9.238	1	0.002	0.73	0.60–0.89
Smoke inside	-0.812	0.116	48.381	1	0.274	0.44	0.35–0.55
Maori	-0.147	0.134	1.197	1	0.002	0.86	0.66–1.1
Pacific	0.379	0.125	9.234	1	0.000	1.40	1.1–1.8
Asian	1.216	0.147	68.689	1	0.000	3.30	2.5–4.4
Other	0.750	0.214	12.229	1	0.000	2.10	1.3–3.2
Constant	-4.795	0.700	46.975	1	0.000	0.00	

Discussion

This paper reported on the relationships of age level, gender, smoking status, school decile rank, ethnicity, parental smoking and smoking within the home with Form Two and Form Six students' current smoking, daily smoking, and smoking expectations for future. Before discussing the implications of these results, the limitations of this study design are acknowledged. Specifically, the sample was derived from a regional population rather than a national sample, which would have enabled useful comparative analyses with existing national databases, such as the Wellington and the

ASH surveys of Form Four students (Laugesen and Scragg, 2002, ASH New Zealand, unpublished data).^{5,6} However, this study, which assessed students from schools in the greater Auckland region, provides a useful, detailed picture of trends within a specific socio-geographic area. Another concern was related to school attendance records, which were not formally collected on the school survey days. It is possible that this omission may result in conservative reports of smoking behaviour, particularly among the Form Six students, who may be absent for reasons such as sports events or work experience. In addition, the data were not assessed as a cluster sample; the school effect could not be assessed. Decile rank was included as an independent variable within the models to control for school socioeconomic status.

This survey is one of the few conducted in New Zealand that provides evidence of early smoking initiation and daily smoking behaviour among Form Two students and Form Six students. Tobacco use among younger adolescents was evident, with a considerable proportion (29%) of Form Two students having already smoked, and 5% who reported smoking on a daily basis. Consistent with previous studies of smoking among older adolescents in New Zealand,⁴⁻⁸ this study showed substantially higher rates of smoking among older adolescents (Form Six students in relation to Form Two students). Daily smoking rates, an important measure of established smoking behaviour among young people, increased by 25% between Form Two and Form Six. Essentially, this study provides further empirical evidence of the magnitude of developmental changes that occur between early adolescence and the mid-teen years that have implications for the conceptualization and design of smoking prevention policy and initiatives.

This study found that the effect of gender was dependent on age for the outcome measure of ever smoker only, with a greater proportion of Form Two males reporting that they had smoked in the past compared with females. This result may be an effect of under-reporting of smoking status, as the tobacco-use measure used the standard 'ever' and 'never' smoking items and should have included the option 'even just a puff' to account for those who have tried smoking but not smoked an entire cigarette. This discrepancy may mean that ever-smoker rates are possibly underestimated, especially within the younger age group. Although recent New Zealand studies have found that girls are significantly more likely to smoke than boys, this was not evident within the present study.⁵⁻⁷ It has been reported that daily smoking among 14- and 15-year-old females significantly exceeded that for boys in the 1992 and 1997 surveys and in the most recent survey conducted in 2001 (Laugesen and Scragg, 2002 unpublished data).⁴ It is possible that the effect for gender that was found only within the Form Two sample may be a factor associated with the different ages of the samples and the demographic profile of this Auckland regional sample (ie, different ethnic distribution of sample). Moreover, this finding reiterates the potential for intervention within this younger population group through reinforcing the benefits of remaining smoke free.

Consistent with previous studies, Form Two and Form Six Maori and Pakeha/European students reported higher ever- and daily-smoking rates compared with students from all other ethnic groups. Conversely, Asian students reported lower ever-smoking behaviour, daily smoking and smoking expectations. Previous research has consistently found that Maori report higher smoking rates compared with other ethnic groups.^{6,7} This discrepancy in smoking rates among the Maori population has

been partially explained in terms of the impact of the colonization of New Zealand by the Europeans, during which time tobacco products were introduced to the indigenous Maori population.⁸ The impact of tobacco use on the health status of Maori has been profound and, accordingly, should continue to be a priority in terms of smoking cessation and prevention initiatives aimed at both young people and adults. In addition, the number of Pacific students ever and daily smoking increased by two thirds between Form Two and Form Six, suggesting a need for interventions targeted appropriately to these groups.

Expectations of future smoking varied significantly by age level, ethnicity and smoking status. Being a sixth former and a current smoker increased the expectation of being a smoker in the future, a finding which was consistent with that identified by Laugesen and Scragg (2002, unpublished data). In this study smokers were found to be significantly more likely to intend to smoke in the future compared with non-smokers. Similarly, older adolescents were more likely to be smokers and, therefore, more likely to expect that they will smoke in the future or at least hold ambivalent attitudes towards their likelihood of smoking in the future. Romer et al found that young people start smoking with the intention to smoke for only a short period, expecting they can quit when desired in the future.⁹ Qualitative studies have provided useful analyses of the relevance of an adolescent's social world in the development of attitudes towards tobacco use. Specifically, older adolescents are identified as being more likely to hold ambivalent attitudes towards their personal smoking expectations and smoking in general, generated in part through the increased prevalence of smoking among this age group.^{10,11}

Recent studies have emerged that challenge arguments regarding the overriding effect of parental smoking on adolescent smoking.¹²⁻¹⁴ It is suggested that parental smoking is most influential as a predictor to adolescent smoking only during the period of early adolescence. After this period, friends' smoking attitudes and behaviours emerge as a stronger predictor of adolescent smoking. In addition, smoking inside the home may also reflect the acceptability of smoking within the family context. Overall, the higher level of smoking acceptability identified in this study among Maori (30%) and Pacific students (21%) supports the relevance of familial smoking norms as an important factor in the pathway to smoking uptake among young people.⁶ The sharp increase in smoking between Form Two and Form Six Asian students may also suggest shifting patterns of acceptable social and cultural behaviours among older Asian teenagers. This differential effect may also reflect the transition between parental to peer networks as predictive of smoking behaviour. Accordingly, public health initiatives aimed at reducing adult smoking should continue to be supported as an ongoing strategy to reduce adolescent smoking uptake.

School decile rank was assessed as a proxy measure of socioeconomic status of the schools. The effect of decile rank on smoking behaviour measure revealed that within the Form Two sample only students from higher-decile-rank schools were more likely to be ever smokers, daily smokers and have higher smoking expectations for their future. A recent study by Scragg and colleagues reported a positive association between amount of pocket money and cigarette smoking in both male and female students.¹⁵ Although this relationship was found to be independent of socioeconomic status, it is possible that students from higher socioeconomic groups have access to cash to purchase cigarettes, or alternatively socialize with adolescents or other adults

(including parents) who purchase cigarettes. Reeder et al also assessed school variables including decile rank and sex composition, and concluded that these factors were significantly associated with daily smoking. However, no effect was observed for current smoking behaviour. Accordingly, it was suggested that differences in 'school culture' (including the school's smoke-free policy) are possibly associated with socioeconomic factors, which may affect the smoking behaviour of students. Similarly, peer group and self-image factors, such as sub-cultural factors and weight-control issues, may also need to be considered.¹⁶

Despite the introduction of the New Zealand Smoke-free Environments Act (1990), which has initiated smoke-free schools and an increase in the price of cigarettes, the prevalence of smoking among adolescent sub-populations remains high.¹⁷ Evidence suggests that current tobacco-control initiatives, primarily those aimed at reducing adult smoking and increasing the price of tobacco, have been effective in slowing the prevalence of smoking among young people.^{6,7} Future adolescent smoking research needs to address the social and cognitive developmental differences between adolescent girls and boys across these age groups.^{3,8} The importance of continuing research into the beliefs and perceptions young people hold towards tobacco (usage, image, acceptability) can only complement and support the impact of existing public policy initiatives aimed generally at the adult population.

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