ORIGINAL ARTICLE

HAS THE CURVE BEEN BROKEN?
TRENDS BETWEEN 1994 AND 2006 IN SMOKING AND ALCOHOL USE AMONG GREENLANDIC SCHOOL CHILDREN

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ABSTRACT

Objectives. To examine the development of smoking and alcohol use among Greenlandic schoolchildren and propose future preventive strategies.

Study design. National survey in schoolchildren grade 6-11.

Methods. Analysis of data from the 1994, 1998, 2002 and 2006 Health Behaviour in SchoolAged Children (HBSC) surveys in Greenland. Trends in the prevalence of the categories never having smoked, non-smoking, daily smoking, never tried alcohol, never been drunk and been drunk 4 times or more were calculated for children and youth aged 11, 13 and 15. In the data from 2006, the age trends for daily smoking and getting drunk 4 or more times, the assessment of risks attributed to substance use and the perception of how easy it was to access cigarettes and alcohol were analysed.

Results. A decrease in daily smokers and in children having been drunk 4 or more times and an increase in non-smokers and in children that had never been drunk was found in both genders among children and youth aged 13 and 15. Among youth aged 15 to 17 years, both cigarettes and alcohol were reported as easy to access. Risk assessment was different for alcohol and cigarettes, as well as between genders.

Conclusions. A decline in the use of tobacco and alcohol among Greenlandic school children was ascertained. Due to the children’s evaluation of easy access and risk regarding smoking and alcohol use, some general recommendations regarding future focus areas of prevention were proposed. (Int J Circumpolar Health 2008; 67(4):299-307)

Keywords: survey, children, alcohol, smoking, prevention strategy
Greenlandic trends in smoking and alcohol use

INTRODUCTION

Detrimental smoking and drinking behaviours are widespread among Greenlandic youth. Both smoking and drunkenness appear to have an early onset (1–3). In 2003, for instance, 42% of children aged 14 to 17 years smoked daily and 46% had been drunk within the past month (1). Compared to international rates, these figures are high (4,5). Encouraging Greenlandic school children to get less involved in substance use is a focus area of the national Public Health Strategy for 2007 to 2012. The goal is to reduce the rate of children below 15 years of age who have been drunk to less than 10% in 2012 (6). A better understanding of current trends in smoking and drinking – as well as knowledge about access and attitudes towards substance use – are necessary tools for evaluating progress towards achieving this goal and improving the current prevention and health promotion strategies.

The purpose of this study was (1) to examine the trends in smoking and alcohol use in school-children from 1994 to 2006, (2) to examine the age trends in daily smoking and binge drinking, (3) to examine the children’s perception of the availability of cigarettes and alcohol and the risks attributed to their use, and (4) to propose areas for future health promotion and preventive strategies regarding smoking and alcohol use in youth.

MATERIAL AND METHODS

The study is based on data from the Health Behaviour in School-Aged Children (HBSC) study in Greenland. HBSC is an international WHO collaborative study including cross-national surveys that are performed every fourth year. In 2006 questions used earlier in the ESPAD study in Greenland were included for children aged 15 to 17 years (1). Because of the small population in Greenland, all schools with children in Grades 6 to 11 (aged 11 to 17 years) were asked to participate. The school board decided on behalf of all parents if the school wanted to participate. In 2002 and 2006, 62% and 67% of schools with school-children participated. In the years 1994, 1998, 2002 and 2006 the participation rate was 62%, 60%, 56% and 67%, respectively. This corresponded in 2002 and 2006 to 36% and 42% of all schoolchildren in the age group (3). The students answered a standardised questionnaire during class, preceded by instructions from the teacher. Students were informed both orally and in writing that participation was voluntary. In this study, non-participation was found on 3 levels: non-participation of schools, of classes and of students. The non-participation was primarily due to non-participation of schools or classes or students being away from school. In 2006, some classes in the participating schools did not participate. Both schools and teachers claimed lack of time and resources as the main reason for not participating. While very few students did not want to fill out the questionnaire, class reports revealed that nearly 10% of students were absent from class on the day of the survey.

The present study included children aged 11, 13 and 15 years: 1,302 (659 girls/643 boys) in 1994, 1,648 (826 girls/822 boys) in 1998, 873 (505 girls/386 boys) in 2002, and 1,366 (698 girls/668 boys) in 2006. For 2006, data from all participating students aged 11 to 17 years (n=2,462) and on 15 to 17 year old students (n=691) were also used.
Both smoking and alcohol use were included, and two questions were asked about each behaviour. Smoking: “Have you ever smoked tobacco?” (At least 1 cigarette, cigar or pipe) (Yes/No) and “How often do you smoke tobacco at present?” (Every day/At least once a week/ Less than once a week/ I do not smoke). Alcohol: “Have you ever tried alcohol?” (Yes/No) and “Have you ever had so much alcohol that you were really drunk?” (No, never/Yes, once/Yes, 2–3 times/Yes, 4–10 times/Yes, more than 10 times).

In 2006, the evaluation of risks attributed to different levels of smoking and alcohol consumption and the evaluation of easy access to alcohol and cigarettes among those aged 15 to 17 years were investigated. Perception of risk was based on “How much do you think people risk harming themselves (physically or in other ways) if they: “... smoke cigarettes occasionally?” “... smoke 1 or more packages of cigarettes per day?” “... have 1 or 2 drinks nearly every day?” “... have 4 or 5 drinks nearly every day?” “... have 5 or more drinks each weekend?” (No risk/Slight risk/Moderate risk/Great risk/I don’t know). Evaluation of access was based on “How difficult do you think it would be for you to get access to the following if you wanted?” (Impossible/Very difficult/Fairly difficult/Fairly easy/Very easy/I don’t know). The question was asked in regard to cigarettes, beer, wine and liquor. Increase in daily smoking and binge drinking behaviour by age: In 2006, the prevalence of never smoking and daily smoking, never been drunk and been drunk more than 4 times were calculated for each year of age between 11 and 17.99 years. The statistical analysis was performed in SPSS version 13.0 and EpiInfo. As not all trends were expected to be linear, both a chi-square test and a chi-square for trends were used to compare prevalences. To analyse age trends, a chi-square for trend was used. Gender differences were analysed with a chi-square test. A p value below 0.05 was considered statistically significant.

RESULTS

Smoking: Generally, the highest prevalence of smoking was found in 1998 and the lowest in 2006. The prevalence of daily smokers decreased in both genders among 13 and 15 year olds from 1998 to 2006, with a significant linear trend among 15-year-old boys, but not among girls (Table I). A highly significant increase in the prevalence of students who had never tried to smoke and in non-smokers was found among both 13- and 15-year-old boys and girls from 1998 to 2006. The linear trends reached statistical significance only among boys (Table I). The proportion of 11 year-olds smoking daily was, in all years surveyed, below 2% among boys and 3% among girls without a trend (p=0.69 in boys and p=0.76 in girls). The proportion of 11-year-old non-smokers was above 92% among the boys in all years surveyed, and above 87% among the girls without trend (p=0.72 among boys and p=0.63 among girls).

Alcohol use: Generally, the highest prevalence of children having been drunk 4 times or more was found in 1998 for both genders, and thereafter decreased among those aged between 13 and 15 years, to the low value found in 2006. An increase in the prevalence of children who had never tried alcohol and who never had been drunk also was seen among both genders for the 13 and 15 years olds (Table II). Among those aged 11 years,
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more than 82% of boys and 89% of girls had never been drunk without trends (p=0.26 and p=0.07, respectively). Less than 4% of boys and 1% of girls aged 11 had been drunk 4 times or more without trends (p=0.11 and p=0.6).

Gender differences: More boys than girls had never tried smoking among those aged 13 and 15 years in all years (p<0.01). More girls did in 1998, 2002 and 2006 smoke daily at 15 years of age (p<0.05). For alcohol use, no consistent gender differences were found regarding the prevalence of children who never had tried alcohol, never been drunk or had been drunk 4 times or more.

Increase in daily smoking and binge drinking behaviour by age: The proportion of non-smokers and children never been drunk decreased (p<0.001 in both genders) and proportion that smoked daily and had been drunk increased (p<0.001 in both genders) from

| Table I. Trends in prevalence (%) in never smoking, non-smoking and daily smoking in Greenlandic schoolchildren from 1994 to 2006 (in percent and OR for trend). |
|-------------------------|------------------|------------------|------------------|------------------|
| Age                    | Boys             | Girls            |
|                        | 1994 1998 2002 2006 | 1994 1998 2002 2006 |
| Never                  | 11 years        | 13 years         | 15 years         | 11 years        |
| tried smoking (%)      |                 |                  |                  |                 |
| OR                     | 68.8 61.5 58.0 64.5 ns | 59.7 59.7 50.0 65.7 p=0.02 |
| 13 years               | 40.4 33.8 33.6 55.1 p<0.001 | 26.3 20.1 17.4 37.8 p<0.001 |
| OR                     | 1.0 0.7 0.6 0.8 ns | 1.0 1.0 0.7 1.3 ns |
| 15 years               | 23.3 17.8 18.4 39.8 p<0.001 | 16.2 9.8 11.7 18.8 p<0.001 |
| OR                     | 1.0 0.7 0.7 2.2 p<0.001 | 1.0 0.6 0.7 1.2 ns |
| Non-smokers (%)        | 13 years        | 15 years         |
| tried alcohol (%)      |                 |                  |                  |
| OR                     | 77.3 68.3 78.1 87.6 p<0.001 | 74.8 55.0 60.0 75.8 p<0.001 |
| 13 years               | 49.1 46.2 40.8 61.2 p=0.002 | 52.8 32.3 26.3 45.8 p<0.001 |
| OR                     | 1.0 0.9 0.7 1.6 p=0.02 | 1.0 0.4 0.5 1.0 ns |
| 15 years               | 11.2 18.7 16.6 7.1 p<0.001 | 15.4 28.9 28.4 11.8 p<0.001 |
| OR                     | 1.0 2.1 1.8 0.7 ns | 1.0 2.2 2.2 0.7 ns |
| Daily smokers (%)      | 13 years        | 15 years         |
| tried alcohol (%)      |                 |                  |                  |
| OR                     | 61.8 72.1 76.6 ns | 61.8 72.1 76.6 ns |
| 13 years               | 43.8 32.9 43.0 59.0 p<0.001 | 43.1 32.9 42.0 51.3 p=0.04 |
| OR                     | 1.0 0.9 1.4 1.8 p=0.001 | 1.0 0.9 1.7 1.4 p=0.03 |
| 15 years               | 15.0 9.9 8.5 22.9 p<0.001 | 12.0 9.9 15.0 18.5 p<0.001 |
| OR                     | 1.0 0.6 0.5 1.7 p<0.001 | 1.0 0.5 1.3 1.7 p=0.003 |
| Never been drunk (%)   | 13 years        |                  |
| tried alcohol (%)      |                 |                  |
| OR                     | 66.7 57.9 55.6 82.0 p<0.001 | 72.8 52.4 55.0 79.9 p<0.001 |
| 13 years               | 31.2 21.9 18.0 39.9 p<0.001 | 31.4 18.2 22.8 31.9 p=0.001 |
| OR                     | 1.0 0.7 0.5 1.6 p<0.005 | 1.0 0.5 0.6 1.0 ns |
| 15 years               | 5.3 10.9 11.1 4.6 p=0.01 | 3.5 15.9 12.7 5.2 p=0.03 |
| OR                     | 1.0 2.2 2.2 0.8 ns | 1.0 2.0 1.6 1.2 ns |
| Been drunk 4 times or more (%) | 13 years | 15 years |
| tried alcohol (%)      |                 |                  |
| OR                     | 5.3 10.9 11.1 4.6 p=0.01 | 3.5 15.9 12.7 5.2 p=0.03 |
| 13 years               | 25.5 36.2 35.0 20.7 p<0.001 | 20.6 34.0 28.7 23.1 p<0.001 |
| OR                     | 1.0 1.4 1.6 0.8 ns | 1.0 2.0 1.6 1.2 ns |
11 to 17 years of age. Both the largest increase in daily smoking and the largest decrease in non-smoking were seen between 13 and 14 years of age. For alcohol, the largest decrease in never been drunk and the largest increase in being drunk 4 times or more was seen between 14 and 15 years of age. Both the prevalence of daily smoking and been drunk 4 times or more increased dramatically from age 15 to age 17 in both genders (Fig. 1).

Adolescents’ evaluation of their access to alcohol and cigarettes: Nearly half (45.9% of boys and 49.9% of girls) regarded it fairly easy or very easy to get access to cigarettes. For alcoholic drinks, 41.0% of boys and 40.9% of girls found it fairly easy or very easy to get access to beer, 27.0% and 23.3% to wine, and 39.0% and 39.1% to liquor. No differences between genders were found in the evaluation of access.

Adolescents’ evaluation of risk due to smoking and alcohol consumption: A high proportion of the adolescents found that smoking 1–2 packs daily was risky compared to occasional smoking. The same proportion of boys and girls thought that occasional smoking induced moderate or great risk, while more boys than girls thought that smoking 1–2 packages daily was not risky (p=0.001). Boys found both daily intake of 1–2 drinks (p=0.04) and nearly daily intake of 4–5 drinks (p=0.01) not or slightly riskier than girls, while no gender differences were found in the evaluation of risk when drinking 5 or more drinks each weekend. Nearly 20% in both genders claimed they did not know the risk attributed to alcohol consumption regardless of the types of consumption, while the same figure was about 10% regarding smoking (Fig. 2 and Fig. 3).

Figure 1. Development from 11 to 17 years in prevalence of not smoking, daily smoking, never been drunk and been drunk 4 times or more in Greenlandic schoolchildren (%).
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Figure 2. 15-to-17-year-old boys' evaluation of risks attributed to smoking and use of alcohol.

Figure 3. 15-to-17-year-old girls' evaluation of risks attributed to smoking and use of alcohol.
DISCUSSION

Despite a general focus on substance use, this is the first investigation on time trends in smoking and drinking behaviour among Greenlandic school children. International surveys have indicated that Greenlandic children have some of the highest rates of smoking and binge drinking (4,5). The decrease ascertained in the proportions of those aged 13 and 15 years smoking daily, or having been drunk 4 or more times, are therefore amenable findings. These findings are supported by the increase simultaneously found in the prevalence of children who had never tried to smoke, who were non-smokers, who had never tried alcohol and who had never been drunk.

The figures might reflect a real breaking point in the health behaviour in Greenlandic children towards lower substance use, although we cannot fully exclude the possibility that the results reflect only a postponing of the age of initiating these behaviours. Even if daily smoking were initiated well before the age of 15 in many students, nearly 20% of students initiated daily smoking between the ages of 15 and 18. A verification of a decrease in the initiation of smoking in young adults is therefore needed.

Some gender differences were found. Boys seemed to consider both smoking and daily alcohol consumption as less risky, while more of the oldest girls smoked daily. Looking at the trends, boys seemed to be more willing to do without smoking. Increased gender differences with higher smoking rates among girls might be expected in the future, as already seen in a number of other European countries (4).

The calculated prevalence was based on self-reported information from surveys. The limitations attributed to surveys include non-participation, and in children also, age concentration of respondents. Nonetheless, the trends found in this study are considered as a valid expression of the development over time of tobacco and alcohol use among Greenlandic schoolchildren, as the surveys are comparable in regards to age and gender distribution.

Smoking is suspected to be a major “gateway” to other forms of substance use (7). There are high correlations between different types of risk behaviour; schoolchildren engaging in one type – smoking, alcohol use or unsafe sex – are more likely to be engaged in other types as well (8). Also in Greenland, smoking students have more often been drunk and had tried hashish (2).

Risk behaviours are influenced from many sources. In a health promotion framework regarding substance use, it is necessary to understand the motives behind smoking and drinking, and the perception of risks attributed to substance use. Young people tend to focus on the perceived immediate attractions of smoking, for example, to help them cope with everyday stress, to facilitate contact with peers and, particularly among girls, to reduce or control their body weight, rather than on its long-term disadvantages (9). Peer pressure, explicit or implicit, is often presented as a major reason for adolescent smoking (10). Exposure to adverse life conditions is also associated with a higher risk of regular smoking (11). For alcohol, social motives seem to be associated with moderate use in youth while coping motives were associated with alcohol-related problems (12). More
schoolchildren in broken or reconstructed families in Greenland smoke and drink alcohol, and more students who drink alcohol rate the communication with their parents as poor (13,14). Coping might be a part of the explanation. Most 15 to 17 year-olds seemed able to distinguish between the risks attributed to being a heavy smoker and the risks of more limited tobacco use, and compared to 2003 (1) fewer adolescents claimed not to know if smoking is risky. For alcohol, many students regarded the risk attributed to an extensive weekend use as being the same as r having a large daily use, and one-fifth did not know if alcohol intake of any of these kinds involved any risk.

Life-style-induced diseases are increasing rapidly in Greenland, and the Chief Medical Officer has concluded that due to the increase in tobacco-related deaths among others, the increased wealth in Greenland has not increased the life expectancy correspondingly (15). In recent years, the laws and regulations aimed towards diminishing the use of alcohol and tobacco have been sharpened considerably. The substantial decrease in smoking might be attributed to the latest and most radical change from 2004, when prohibition of selling alcohol or tobacco to minors and abolishing smoking in all institutions where there are children was introduced.

The results show that effective programs aimed at lowering substance use in children are still needed. Even if the study of substance use is a part of the curriculum in schools, the figures indicate there is still a need to improve the knowledge of the risks attributed to substance use. Despite regulations, access has not been a major factor in restricting either smoking or alcohol use among 15-17 year-olds.

High-risk behaviour has already caught the attention of public-health strategists, hence the following general recommendations for improving preventive programs are proposed:

- Intensify the health promotion and preventive efforts towards adolescents and especially focus on the risks attributed to high versus low alcohol consumption.
- Strengthen awareness of gender differences in consumption and in risk assessment.
- Address parents and other adults regarding their acceptance of health-risk behaviours in older children (as well as among themselves).
- Provide information to adults and store owners about their responsibility regarding regulating minors’ access to alcohol and cigarettes.

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REFERENCES

1. Statistics Greenland. ESPAD 2003. Rusmiddlesesløgselse blandt unge, årgang 1987 og 1988 i Grenland [Use of drugs in youth born in 1987 and 1988 in Greenland]. The European Survey on Alcohol and Other Drugs. 2003:33.

2. Schnohr C, Pedersen J, Alcón M, Niclasen B. Sundhed og helbred hos skolebørn i Grønland fra 1994 til 2002 [Health in Greenlandic School-Children from 1994 to 2002]. Nuuk: Inussuk Report No. 2-2004; 2005:119.

3. Niclasen B, Løngard K, Laursen LK, Schnohr C. Sundhed på toppen [Health on the top of the world]. Nuuk: Home Rule Government; 2007:137.

4. Currie C, Roberts C, Morgan A, Smith R, Setterbulte W, Samtal O, et al. Young People's Health in a Context: Health Policy for Children and Adolescents. Copenhagen: World Health Organization; 2004:237.

5. Hibell B, Andersson B, Bjarnasson T, Ahlstrom S, Balakireva O, Kokkevi A, et al. The ESPAD Report 2003. Alcohol and Other Drug Use Among Students in 35 European Countries. Stockholm: The Swedish Council for Information on Alcohol and Other Drugs; 2004:436.

6. Home Rule Government. Inuunneritta - Folkesundhedsprogram, Landsstyrets strategier og målsætninger for folkesundheden 2007-2012 [Public Health Programme, strategies and goals from 2007 to 2012]. Nuuk: Home Rule Government; 2007:37.

7. Kandel DB, editor. Stages and pathways of drug involvement: Examining the Gateway Hypothesis. New York: Cambridge University Press; 2002. 384 pp.

8. Brener ND, Collins JI. Co-occurrence of health-risk behaviours among adolescents in the United States. J Adolesc Health 1998;22(3):209–213.

9. Verduykt P. Summary of the literature on young people, gender and smoking. In: Lambert M, Hublet A, Verduykt P, Maes L, Broucke SVd, editors. Gender differences in smoking in young people. Brussels: Flemish Institute for Health Promotion; 2002. Pp. 15–32.

10. Engels R, Knibbe RA, Vries Hn, Drop MJ. Antecedents of smoking cessation among adolescents: who is motivated to change? Preventive Medicine 1998; 27(3):348–357.

11. Anda RF, Croft JB, Felitti VJ et al. Adverse childhood experiences and smoking during adolescence and adulthood. JAMA 1999;283(15):1652–1658.

12. Kuntsche E, Knibbe R, Gmel G, Engels R. Why do young people drink? A review of drinking motives. Clin Psychol Rev 2005;25:841–861.

13. del Carmen M, Alcon G, Pedersen JM, Maria A, Gonzalez C. Greenlandic family structure and communication with parents: influence on schoolchildren’s drinking behaviour. Int J Circumpolar Health 2002; 61(4):319–331.

14. Granado Alcon MC, Pedersen JM. Family as a child development context and smoking behaviour among schoolchildren in Greenland. Int J Circumpolar Health 2001;60(1):52–63.

15. Office of the Chief Medical Officer in Greenland. Årsberetning 2005. [Annual Report 2005]. Nuuk: Office of Chief Medical Officer in Greenland; 2006: 62.

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