Tobacco use among young adults in Norway, 1973-95: has the decrease levelled out?

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Abstract

Objective—To describe the prevalence of tobacco use among young Norwegian adults, 1973-1995.

Design—Cross sectional personal and telephone surveys.

Setting—Norway, 1973-1995.

Participants—Population based samples of Norwegians aged 16-74 years.

Results—A trend to a decline in tobacco use among young adult Norwegians during the 1960s and 1970s levelled out during the 1980s. Hence, the total prevalence of smoking in Norway decreased by only two percentage points from 1980 to 1993, as compared to approximately 10 percentage points in many other European countries. An increase in smoking prevalence (and in the use of snuff among males) in the age group 16-19 years has been observed in recent years. Thus smoking prevalence among young males and females in 1995 was comparable to that observed in the early 1980s.

Conclusions—Trends in tobacco use reflect an underutilisation of preventive measures in general, and health education measures in particular. Financial resources appropriated for health education and information were reduced by 90% during the 1980s.

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Keywords: tobacco use; young adults; Norway; population trend

Calculations done at the World Health Organisation and the University of Oxford¹ indicate that every second smoker will die prematurely as a result of smoking. The calculations indicate that in Norway alone approximately 2000 people between the ages of 35 to 69 years die annually as a consequence of smoking, and that each of these people lose on average 21 years of life expectancy. In addition, approximately 3000 people of 70 years or older die from smoking, and each of these loses on average eight years of life expectancy. The report also provides prognoses on cancer mortality. These prognoses indicate that among males below the age of 70 the total cancer mortality and the mortality for cancers associated with smoking are decreasing. On the other hand, among Norwegian females below the age of 70 the total cancer mortality has been increasing, which is related to an increase in the mortality of cancers associated with smoking. The mortality among this group of

Norwegian females for cancers not associated with smoking has been decreasing.¹

The trend in cancer mortality in Norway reflects changes in smoking behaviour which took place several decades ago. Rønneberg *et al*² have shown that the highest proportion of smokers among males was observed in the 1950s, while the highest proportion of smokers among females was observed around 1970. In the decades after 1955, the proportion of daily smokers among young Norwegian males decreased, while the downward trend for female smokers started early in the 1970s. The proportion of daily smokers among males of between 15 and 19 years fell from 57% of the cohort born between 1935 and 1939 to 20% of the cohort born between 1970 and 1974, while for females in this age group the proportion of daily smokers fell from 36% in the cohort born 1955-59 to 25% in the cohort born in 1970-74.²

Studies conducted on middle school pupils have shown that the proportion of smokers declined through the 1980s.³⁻⁵ Research on pupils in the seventh, eighth, and ninth grades conducted by the National Council on Smoking and Health⁵ has shown that in the period 1980 to 1990 the proportion of daily smokers among boys declined from 13.4% to 8.8% and among girls from 11.8% to 9.8%. Klepp *et al*³ reported that in the period 1983 to 1989 the proportion of daily smokers among ninth graders declined from 21.8% to 15.6% among girls, while the corresponding figures among boys were 16.8% and 17.2%.

The aim of this paper is to describe the trends in tobacco use (smoking and use of oral snuff) in Norway in the period 1973 to 1995. Because the proportion of tobacco users among young adults is a measure that is particularly sensitive to changes in factors that either encourage or discourage smoking or snuff use, we shall concentrate on trends in smoking and snuff use in this group. We shall discuss tobacco control measures used in Norway during this period.

Methods

The data presented here were collected from the annual tobacco survey of the National Council on Smoking and Health. From 1973 to 1991 these surveys were carried out annually as an addendum to *Statistics Norway's* annual labour market surveys. Starting in 1976, questions concerning tobacco consumption were included in the annual fourth quarter survey. As of 1992, *Statistics Norway* placed the

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Figure 1 Proportion of daily smokers among Norwegian males and females aged 16 to 74 years, 1973–95.

questions in the omnibus survey of the fourth quarter.

Since 1975 the samples have been designed in accordance with a standardised sampling plan—developed by *Statistics Norway*—and designed to ensure that the sample would be representative of the adult Norwegian population. Surveys on smoking that were attached to the annual labour market surveys had a total sample of about 3000 people of ages 16 to 74, while the total sample for the omnibus survey included about 2500 people of ages 16 to 79 (data on tobacco consumption were collected only on people of ages 16 to 74). It is important to note that when the data from one year are stratified by age, the number of respondents in each age group is rather low. For example the number of females in the age group 16–19 years is about 80 for each survey year; thus each of the data points for this age-gender group in fig 3, which represent three year sliding averages, is based on a total sample of about 250. The corresponding number of female respondents with the lowest level of education in the age group 25–35 years varies from 60 to 180. Consequently, minor changes from one year to another should be interpreted cautiously. The description of the data thus focuses on trends occurring over many years.

As late as 1980 the data were gathered by trained interviewers conducting personal structured interviews at the respondents' homes. Between 1980 and 1991 data collection was done by telephone interviews. From 1992 *Statistics Norway* again turned to collecting data by personal interviews, supplemented by telephone interviews in cases where the respondent was not reached at home. This meant that in 1993, for example, 71% of the respondents were interviewed at home, while 29% were interviewed over the telephone. The lowest response rate occurred in the later years of the surveys. For example, there was a response rate of 71.3% in 1993. *Statistics Norway* has generated a documentation report for each survey. These reports provide detail concerning the sample size, data collection, non-response, and conditions associated with the reliability and validity of the data. (Details regarding each annual survey are available from the National Council on Tobacco and Health, Norway.)

In addition to questions concerning tobacco consumption, the surveys had questions regarding knowledge of the consequences of tobacco use, attitudes towards preventive measures, and other relevant themes. In this article we provide data concerning the following question: "Do you smoke?", with response categories of "yes, daily", "yes, occasionally", and "no". The use of snuff was determined by the question: "Do you use snuff daily, occasionally, or never?". The question on use of snuff was included in surveys beginning in 1985. The formulation of the questions on tobacco consumption follows the recommendations of the World Health Organisation. A more detailed description of the survey form has been published elsewhere.⁷

The results are described in terms of three year sliding averages of the proportion using tobacco products. This means that the stated proportion of daily smokers for a given year is an average of the registered proportion of daily smokers for that year, the year before, and the year after (the result stated for 1983 is hence an average of the measures for the years 1982, 1983, and 1984). In 1995 three data collections were undertaken. The prevalence data presented for 1995 were estimated by first computing an average of these three data collections, and then again computing the average of the prevalences from 1994 and 1995. As regards oral snuff, the most recent data are from 1994, and the data reported for 1994 thus represent an average of the data for 1993 and 1994.

Results

PROPORTION OF DAILY SMOKERS IN NORWAY, 1973–95

Figure 1 shows the prevalence of daily smokers among Norwegian males and females of the ages 16–74 from 1973 to 1995. The proportion of daily smokers among males declined from 52% in 1973 to 36% in 1990 ($P < 0.001$, Mantel Haentzel χ test for trend for the years 1973 to 1990), after which it remained relatively stable until 1995 (35%) ($P > 0.05$ for the years 1991 to 1995). Among females the proportion of daily smokers was stable from 1973 (32%) to 1995 (32%) ($P > 0.05$ for the years 1973 to 1995).

DAILY SMOKERS IN NORWAY AND IN OTHER EUROPEAN COUNTRIES, 1980–93

Figure 2 shows the proportions of daily smokers among adults in eight European countries in 1980 and 1993.^{8–10} In 1980, Norway was midway among these countries, with 37% of the population being daily smokers. In 1980 The Netherlands was the worst among these countries, with 43% as daily smokers, while Finland was best at 26%. In 1993 Finland was second best at 24%, while Sweden was best at 23%. From 1980 to 1993, Sweden, Great Britain, Ireland, and The Netherlands had a reduction of about 10 percentage points, while Belgium had a decrease of 15 percentage points in the same period. In contrast, the decrease in Norway in the same period was two percentage points. As a result, Norway had the

Figure 2 Proportion of daily smokers in eight European countries in 1980 and 1993.

Figure 3 Proportion of smokers among Norwegian females aged 16 to 19 years, 1973-95.

highest proportion of daily smokers among these countries in 1993. (Because data on smoking prevalence in different countries may originate from surveys that are not strictly comparable, one should only make tentative conclusions when comparing them. However, data collected by a similar method over many years within a country may allow for more valid comparisons of trends between countries.)

SMOKING AMONG YOUNG NORWEGIAN FEMALES

The proportion of females in ages 16-19 smoking daily declined from 39% in 1973 to 21% in 1985 (fig 3). Thereafter, the proportion of daily smokers increased somewhat in this group until 1988, after which there was a slight decline again until 1995 (23%). In this group of females, the proportion of occasional smokers was relatively stable at just over 10% in the period 1973 to 1990. However, it has since increased continuously, reaching 20% in 1995 ($P < 0.01$, Mantel Haentzel χ^2 test for trend for the years 1990 to 1995). The proportion of all smokers (both daily and occasional) in this age group was 44% in 1995; one must go back to the 1970s to observe a similarly high level.

Among females aged 20 to 24 years the proportion of daily smokers declined from 46% in 1973 to 34% in 1987, increased somewhat until 1989 (37%), and then declined until 1995 (30%). The proportion of occasional smokers in this group of females has varied between 10% and 16%, except for the period early in the 1980s when it approached 20%. Among females aged 25 to 29 years, the proportion of daily smokers declined from 53% in 1973 to 40% in 1977, after which it increased again to 49% in 1983. Thereafter the proportion of daily smokers declined slightly over several years, and was 32% in 1995. The proportion of occasional smokers among

Figure 4 Proportion of smokers among Norwegian males aged 16 to 19 years, 1973-95.

females in this age group was 16% in 1973 and 15% in 1995.

SMOKING AND SNUFF USE AMONG YOUNG NORWEGIAN MALES

In 1973, 37% of males aged 16 to 19 years smoked daily (fig 4). This proportion declined to a low of 18% in 1989. However, this proportion has since increased every year, to a level of 26% in 1995, approximately the same level as in the early 1980s. From 1990 to 1995 the increase in the prevalence of daily smoking in this group of males was significant ($P < 0.05$, Mantel Haentzel χ^2 test for trend for the years 1990 to 1995). During almost the entire period since 1973, the proportion of occasional smokers has remained just over 10%. However, recent years have seen an increase to 18% in 1995 of occasional smokers in this group of males. The trend from 1990 to 1995 was significant ($P < 0.05$).

In the age groups 20-24 and 25-29 years the proportions of daily smokers in 1973 were 52% and 53% respectively. For males aged 20 to 24 years this proportion declined to 33% in 1989, after which the decline appears to have stopped (34% in 1995). Among males aged 25 to 29 years a stable decline in the proportion of daily smokers can be observed for the whole period (except for a few years), reaching 37% in 1995. The proportion of occasional smokers for both age groups has remained somewhat over 10% throughout the whole period.

For decades some of the tobacco consumed in Norway has been in the form of oral moist snuff, which is generally placed as a pinch under the upper lip. The proportion of daily and occasional snuff users among males aged 16 to 24 years increased from 9% in 1985 to 15% in 1994 ($P < 0.011$, Mantel Haentzel χ^2 test for trend) (fig 5). Among males of the ages 65-74 the proportion of snuff users declined from 12% in 1985 to 6% in 1994 ($P < 0.05$).

SMOKING AND LEVEL OF EDUCATION

Figure 6 shows the proportion of daily smokers among males and females aged 25 to 35 years according to length of formal education for the period 1976 to 1995. Among people with nine or fewer years of education, the proportion of daily smokers oscillated around 60% from 1976 to 1988. Thereafter the proportion of daily smokers among females increased to almost 80% for the years 1990 to 1991, declining again to about 60% in 1995. Because the number of females in this group is very low,

Figure 5 Proportion of daily and occasional snuff users among Norwegian males, 1985-94.

Figure 6 Proportion of Norwegian daily smokers, by education, among those aged 25 to 35 years, 1976-95.

these swings may be the result of random chance.

Among males (25 to 35 years) with 10-12 years of formal education, a decline from 1976, with 52% as daily smokers, to 1980-81 with 45% as daily smokers was observed, followed by minor swings to a level of 42% in 1995. For females with this level of education, an increase in daily smokers was observed, from 39% in 1976 to 47% in 1988. Thereafter until 1995 only minor swings occurred around a prevalence of 47%.

Among females and males with education equivalent to university level (13 years of formal education), the proportions of daily smokers were 15% and 19%, respectively, in 1995. Females with education at the collegiate level were at about the same smoking level as in 1976 (19%), though the proportion had risen to as high as 30% through the 1980s. Among males (25-35 years old) with the highest educational level, the proportion of daily smokers was just under 30% in the years 1976 to 1987. Thereafter it declined to 17% in 1991, and has remained stable until 1995 (19%).

Discussion

Considering the major health policy goals, two conclusions can be drawn from these results. First, in recent decades we have come no closer to the goal of having 80% of the population smoke-free by the year 2000, as stipulated in the World Health Organisation report *Helse for alle for Europa*.¹¹ Second, sociodemographic

differences in smoking behaviour are continuing, and this will probably make it more difficult to reach the goal of reducing disparities in morbidity and mortality between different sociodemographic groups.¹¹ It is especially critical in this context that 60% of people with no education beyond middle school are daily smokers. Although the number of people with such a low level of education is decreasing over time, the finding is grave because these people are probably exposed to an accumulation of factors related to lifestyle, living conditions, and environment (residence and work) that are unfavourable to health.¹¹

A much larger group numerically is people of the ages 25-35 with a high school education. Thus it is especially disturbing that the proportion of daily smokers in this group is about 40%, which is twice as high as the proportion among people with university level education. In order to reach the WHO public health goal, it is necessary to invest heavily to reduce the prevalence of smoking among people with little education or with education at the high school level.

A key finding of this study is that the decline in daily smoking among young Norwegian females and males observed during the past several decades appears to have ceased toward the end of the 1980s. That finding—along with the significant increase in recent years in daily and occasional smoking among males of 16 to 19—is disquieting. In 1995 the total proportion of smokers (daily and occasional) among males aged 16 to 19 years was 44%, which corresponds to the level found in 1977 (although the distribution of smokers between the two categories of smoking was quite different). The situation among young males is also serious because snuff use has increased in the last decade. Also disturbing is the increase in occasional smoking among females aged 16 to 19 years.

However, some recent trends appear to be favourable. Among females in the age groups 20-24 and 25-29, and males of 25-29, a slight decline in both daily and occasional smoking has occurred. Our data do not reveal the cause for this trend, but it may reflect the favourable patterns seen in smoking prevalence among pregnant females.¹² Moreover, females and males in these age groups have stated that pregnancy and having small children are important reasons for stopping smoking.⁷ This trend has occurred in parallel with media exposure on recent research on the consequences of smoking for the fetus and a small child, as well as health education conducted by public health authorities, voluntary organisations, and health professionals.

WHAT DOES SMOKING PREVALENCE IMPLY?

Smoking prevalence in Norway reflects the sum total of all decisions taken by all individuals concerning smoking. The proportion of smokers in a country (or a subgroup) is therefore a characteristic of a social system—that is, a society. It reflects an aggregation of decisions and actions of individuals. The decision-making processes behind tobacco use

behaviours vary from person to person, mostly according to factors such as inheritance, personality, social environment, personal preferences, financial resources, relevant knowledge and attitudes, and so on. In psychology these factors are called proximal variables because they are "proximal" to an individual and to the decision taken. Some of these proximal variables reflect the characteristics of what are called "distal variables", which describe the qualities of the macrostructure of society. Collectively these variables represent the decision structure within which an individual makes his decisions. When it is observed that smoking prevalence (a macro expression) changes over time, changes in other macro variables are usually considered as possible explanations. These kinds of changes may contribute to whether people start and stop smoking. Examples might include an increase in the average purchasing power of youth,¹³ emphasis on the modern feminine image of remaining thin,¹⁴ and other trends and fads that associate smoking with the image of the modern individual.

Public health authorities have power over some factors that make up the social decision making framework which circumscribes individual decisions about smoking. These factors can be divided into three main groups: the price of tobacco (tax policy), legal measures, and health information and education of all kinds (mass media campaigns, health information in schools, and so on). The effects of these tools are well documented.¹⁵⁻¹⁷ When the decline in smoking appears to have stopped, this suggests that the available tools have not been fully utilised, given the trends in other macro factors encouraging smoking. However, this does not mean that implemented measures have not had any effect. The impact of these measures can only be determined by studies with a suitable design, whereas changes in smoking prevalence over time reflect a summation of all the factors influencing smoking behaviour.

THE PRICE OF TOBACCO IN NORWAY AND IN OTHER EUROPEAN COUNTRIES

The claims that tobacco is very expensive in Norway and that tobacco products are becoming increasingly expensive are widely believed and repeated in Norwegian media. However, these claims do not conform to the facts. In 1973 and 1994 a male industrial worker with an average wage had to work 23.9 and 24.1 minutes, respectively, to buy 20 cigarettes, while the equivalent times to buy a pack of rolling tobacco were 26.1 and 30.5 minutes. The nominal price of cigarettes in Norway appears to be high compared to other countries.¹⁸⁻¹⁹ In 1994, it cost 38 Norwegian crowns (NCR) for 20 cigarettes, which was the highest price per package in Europe. In 1994 corresponding prices were 32 NCR in Denmark, 28 NCR in Sweden, and 27 NCR in Great Britain and Ireland. However, if purchasing power is taken into consideration, the price of cigarettes in Norway is in the middle of the European scale. Furthermore, the Norwegian nominal price for rolling

tobacco is low. Calculated in terms of 20 cigarettes, the price was 19 NCR in 1994. In summary, when the nominal price is adjusted to the national income level, the price of a pack of cigarettes in Norway is in the middle of the European scale, and rolling tobacco is inexpensive compared to the price of cigarettes in other European countries.¹⁹ Moreover, Norway is unique because more than 50% of daily smokers use rolling tobacco, whereas that proportion in other Western countries is usually under 10%. Among Norwegian smokers with a middle school educational level and among people residing in northern Norway, about two out of three people smoke rolling tobacco. Rolling tobacco contains two to three times more nicotine, tar, and carbon monoxide than regular cigarettes.²⁰

Consequently, we can make four points about pricing policies. First, in Norway, it is not more expensive to buy cigarettes today than it was 20 years ago. Second, the real price for rolling tobacco in Norway is very low compared either to the price of cigarettes in Norway or to the price of cigarettes in other European countries. Third, the price of cigarettes in Norway is at about the European norm. Fourth, there may be reason to believe that the average Norwegian smoker—and especially those with the least amount of education—are more dependent on nicotine than smokers in other countries because of the high proportion of smokers smoking rolled tobacco. One indication of this is that a survey of Norwegian smokers found that 32% of those smoking cigarettes had attempted to quit during the preceding year, while the corresponding proportion of those rolling tobacco was 18%.²⁰ In sum, these factors suggest that pricing policy has not been fully utilised in Norway during the last 20 years.

USING LEGAL MEASURES

Norway has traditionally been in the forefront of countries using legal measures to discourage smoking and to protect people against passive smoking.²¹ Norway was a pioneer in the banning of direct tobacco advertising (adopted in 1975) and in protecting people against passive smoking in public places and worksites (legal measures adopted in 1988). Norway still appears to be in the forefront in the use of legal measures—especially with the recent revisions that began to be implemented in 1996, and which include a minimum age of 18 years for buying tobacco, a ban on cigarette vending machines, and the prohibition of indirect advertising (to be implemented in 1997). Furthermore, new regulations taking effect in 1996 totally prohibit indoor smoking in schools and nurseries.

HEALTH INFORMATION AND EDUCATION

Norway has lagged in one area: the underutilisation of health information and education to discourage tobacco consumption. Other countries have put considerably more emphasis on this than Norway during recent years. A survey in 1994 showed that compared with 10 other countries and states (including Finland,

Canada, Great Britain, The Netherlands, and some states in the USA and Australia), Norway was in next to last place, per capita, for public spending on the prevention of tobacco use.²² For example, Finland spent five times as much per inhabitant. The trend over time shows the low priority this work has been given in Norway. An average of nine million NCR were spent annually in the years 1975 to 1980 on tobacco information and education. This expenditure was reduced by 90% through the 1980s, so that by 1994 only 0.825 million NCR were spent on these goals (including an extra appropriation for the smoke-free Olympic Games at Lillehammer).²³

The low priority given to this objective is also shown by the fact that in the period 1985 to 1994, funding on the order of 300 million NCR was appropriated for information, education, and training against the spread of HIV infection²⁴; in the same period less than 10 million NCR were appropriated for similar measures against tobacco consumption. Throughout these 10 years about 350 people in Norway have died as a result of HIV infection,²⁴ while the corresponding number of tobacco attributable deaths is probably about 75 000.²⁵

Conclusion

Measured by the results achieved in preventive work against tobacco use, we conclude that in recent decades Norway has not been a pioneer. The public health goals in this area have been unrealistic, given the measures employed to achieve them. This underlines the importance of a lesson learned in other "pioneer" countries—namely, that no one can afford to rest on their laurels.²⁶ Compared with trends in other countries and previous results in our own country, it appears that too little has been done in the category of information, education, and training. These measures, which require the largest financial resources, achieve results^{27, 28} and are cost-effective.²⁹ The World Bank has shown, on the basis of American statistics, that one year of life is gained by spending \$18 000 for treatment of lung cancer, \$100 to \$500 for screening for uterine cancer, and \$20 to \$40 for preventive measures against tobacco use.²⁹ The World Bank concludes that anti-smoking measures are among the most cost-effective health measures that can be carried out and that only vaccination programmes for small children are more cost-effective in a highly developed society. Consequently, by increasing the annual appropriation to prevent tobacco use for 1995 and 1996 to a total of 15 million NCR, Norwegian authorities can expect a high return on this investment. However, this investment still falls far short of the 55 million

NCR that the World Health Organisation recommends that Norway allocate to this work,²³ especially when unfavourable trends are taken into account, which probably reflect many years of neglect.

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