COMMENTARY

Smoking, Physical Activity, and Diet in North American Youth

Where Are We At?

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Behavioural risk factors (RF) for chronic disease among youth, including smoking, inactivity, and unhealthy diet, continue to preoccupy public health practitioners because they are prevalent,[1] are associated with short- and long-term health consequences,[2,3] track into adulthood,[4] and are amenable to prevention.[5,6] This commentary presents an overview of the prevalence, secular trends, determinants, and research priorities related to these RFs among young people today.

Smoking

While smoking has declined in North American adults over the last decade,[7] there has been little progress among youth despite widespread prevention programs, explicit health warnings, and declines in the social acceptability of smoking. Smoking increased steadily among US high school students, from 12.7% in 1991 to 16.8% in 1999.[8] In Canada, although the prevalence declined through the 1980s, it increased sharply through the early 1990s, leveled off in 1996, and has since remained stable at around 29% in 15-19 year-olds.[7,9-11]

Children begin experimenting with cigarettes around age 12,[12] although age at initiation can be as low as 8 years.[13] Smoking increases sharply with age,[14] and girls appear to smoke more than boys during adolescence.[10,13,15] Daily smoking begins around age 16.[2] The earlier smoking begins, the longer the person will smoke,[2] the greater the severity of addiction,[2,16] and the lower the likelihood of quitting.[17] Teens, especially girls, have more difficulty quitting than adults.[16] While it is commonly believed that physiological dependence develops over 2-3 years,[2] recent evidence suggests that symptoms of nicotine dependence (ND) occur even during early sporadic smoking.[18]

Well-established RFs for smoking onset include socio-demographic characteristics, psychosocial factors, early puberty, and low academic involvement.[2,18-26] While depression and stress are known RFs,[27] smoking might in fact cause depression.[28] Weight control smoking has been observed among women and teenage girls,[2,16] but girls as young as age 9 might smoke to control weight.[26] Finally, genetic predisposition to ND is a new area of inquiry that could lead to novel cessation treatments.[29] Social and environmental RFs include family and friends smoking, cost, accessibility of cigarettes, advertising, and promotional activities including sponsorship of sports and music events.[2]

Priority research areas in youth smoking include investigation of the relative importance of individual and environmental RFs, particularly in specific sub-groups (e.g., stage of onset, ethnicity); the relationship between depression and smoking; the role of body weight among girls; and factors associated with quit attempts. Valid measures of the irregular smoking that occurs in early onset are needed; and there is a continued urgent need to identify effective prevention and cessation strategies for youth. Finally because early dependence could impact on smoking onset and in turn, the design of prevention programs, we need to determine at what levels of cigarette exposure ND begins to influence early smoking patterns.

Physical inactivity

Inactivity is an established RF for coronary heart disease, colon cancer, diabetes, high BP and breast cancer.[30] Short-term positive effects of activity in youth include improved BP, body weight, lipid and lipoprotein levels, psychological health, and development of bones, muscles and joints.[30] Inactivity in youth clusters with other unhealthy behaviours such as smoking, lower fruit and vegetable consumption, and more TV viewing.[31,32]

All youth should be active daily, and they should engage in ≥3 moderate-vigorous sessions weekly lasting ≥20 minutes.[33] However 35% of US students do not participate in any vigorous activity; only one quarter participate daily in light-moderate activity (walking, bicycling); 45% do not play on any sports teams, 14% report no activity at all; and 44% were not enrolled in school physical education classes.[34] In 1998, half of Canadian girls and one quarter of boys did not exercise ≥2 times weekly.[35]

Coinciding with recent dramatic rises in obesity,[36-39] steadily decreasing proportions of youth meet minimum recommended activity levels.[30,35,40,41] From 1990-98, the proportion of Canadian children exercising ≥2 times weekly declined.[35] A major contributing factor to observed declines undoubtedly relates to time spent using electronic media. On average, children spend 4 hours daily watching TV, videotapes, playing video-games, or using the computer. One third watch TV ≥3 hours per day; 17% watch ≥5 hours per day. Walking and bicycling by US children decreased 40% from 1977-94; automobile trips increased markedly during the same time period.[42] Finally, daily attendance in high school physical education classes declined from 42%-29% from 1991-99.[8]

Age and sex are well-established influences on physical activity. Boys are 15-25% more active than girls through adolesence.[30] Activity, especially vigorous

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activity, decreases steadily with age in both sexes[30] beginning between ages 9-14. Declines are thought to start earlier in girls.[43-46] Socioeconomic status is linked to activity, possibly reflecting few resources to participate in organized sports.[47,48] Ethnicity is influential – children of Asian origin are less active than children from other ethnic groups.[47] Psychosocial RFs include intentions, attitudes, self-efficacy, perception of sports competence, perceived benefits and barriers to activity, and enjoyment of sports.[30] Other influences include participation in organized sports,[47,48] time spent outdoors, enjoyment of competition in boys, use of activity for weight management in girls, and features of the social and physical environments.[47]

Research priorities in youth activity include assessing the activity patterns and determinants at key transition ages and in specific sub-groups (ethnicity, SES); evaluation of the interactive effect of psychosocial, cultural, environmental, and public policy influences; surveillance of activity levels in youth, school policies and student participation in activity at school; improved validity of self-reported activity, which is the only feasible method of measurement in large-scale surveys; finally, there is continued need to identify effective strategies to increase activity levels in youth.

Unhealthy diet

Long-term benefits of healthy eating include reduced risk of coronary heart disease, some cancers, stroke, diabetes, high BP, and osteoporosis;[49,50] short-term benefits among youth include optimization of growth, health, and intellectual development, and prevention of under-nutrition, iron deficiency anemia, obesity, eating disorders, dental caries, and unsafe weight loss methods.[49]

Secular trends show that total energy and fat have decreased,[51] but consumption of soft drinks, French fries and mixed dishes has increased[52] and fruit and vegetable consumption has declined markedly.[35] CDC has identified three areas of concern in youth nutrition:[49] youth consume too much fat – only 15-16% and 8% meet current recommendations for total and saturated fat intake, respectively;[53] teenage girls do not consume enough calcium and youth do not consume enough fruits and vegetables – only 20.4% eat the recommended ≥5 servings daily, and fried potatoes account for most vegetables consumed;[54-56] one half of teens consume ≥3 snacks high in fat, sugar, and sodium daily.[57]

In Canadian youth, the top 10 energy sources include among others, cakes, cookies, jams, salty snacks and fruit drinks.[58] Six percent of kilocalories daily are obtained from carbonated beverages. Foods never eaten by many youth include broccoli, cabbage, spinach, fish, and (among girls) beef. Foods eaten by most youth include pizza, ice cream, and French fries. Boys are relatively well nourished, but over half do not eat ≥5 fruits and vegetables daily, and have high intakes of empty calories. Girls have low intakes of calcium, folate, iron and zinc, reflecting the fact that approximately 60% do not attain the minimum daily portions of dairy products or meat.

Factors associated with diet in youth include SES, ethnicity, household size, and level of physical activity.[59] While more costly nutrients meet recommended intakes, consumption is lower among children from poorer and larger families.[59] Other influences on diet include families eating together,[60] attitudes and perceptions of food and health, individual preferences,[61-64] mother's nutritional knowledge,[61,65] parents imposing dietary restrictions[66] and environmental factors.[61,63,64,67]

Research priorities pertaining to diet in youth include studying the interactive effects of psychosocial, cultural, environmental, and policy influences on food choices, especially in low income and ethnic subgroups; establishing the validity of low-burden dietary data collection methods; establishing dietary surveillance systems; and identifying effective strategies to assure optimal nutrition in youth.

COMMENT

While the benefits of not smoking, being active and eating well are presumed to be common knowledge, these healthy behaviours are *not* highly prevalent in youth. Crucial questions are why? and What can be done? Smoking in youth appears to be inextricably linked to looking cool, appearing older, taking risks, and flouting authority. Despite years of legislation, tobacco is easily accessible to youth and omnipresent in films and the media. Parents, teachers, and other influential adults who smoke unconsciously model the behaviour. Finally, early nicotine dependence might make it difficult for children to stop smoking.

Inactivity is almost inevitable in a society dependent on the electronic media. It is perhaps not yet widely understood by parents that children are at risk for health-related consequences when they spend hours in front of the TV and computer or talking on the telephone. Our dependence on automobiles for travelling even short distances encourages inactivity. Sports, while readily available in many communities, often seem more geared to the elite athlete than to encouraging children and their families to enjoy being active. Parental concerns about safety curtail outdoor play. Finally, with cutbacks and fiscal restriction, school priorities often exclude physical activity.

Our children are bombarded with advertisements for fast foods. High fat, salty, and high sugar snacks are universally available, highly appealing and taste good. Double income families often mean less time for meal preparation, and it seems that family interaction around mealtime is not as highly valued as it used to be. Misinformation about nutrition is considerable and there is continuing reliance on quick nutritional fixes through fad diets and alternative health products.

Causes of risk behaviour are clearly complex and it is probable that intervention, to be effective, will have to encompass public health, clinical, program and policy initiatives that target youth, their families, and their social and physical environments. However, unless substantial preventive efforts are implemented, these disturbing data on risk behaviour in youth foretell that the incidence of chronic diseases, including cardiovascular disease, diabetes, several cancers, and osteoporosis, will continue to impose a severe burden on North American society. Healthy behaviour takes time, effort, and will – we must work to make it valued as a priority commodity in all sectors of society.

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