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Age-related health risk behaviors of adolescents with physical disabilities

Summary

Objective: To investigate age-related differences in health risk behaviors in 11–12-, 13–14-, and 15–16-year-old adolescents with physical disabilities.

Method: Health survey data from 319 adolescents with physical disabilities were compared with the same data from 7 020 adolescents in a national sample.

Results: Significant age-related differences were found for having tried smoking, smoking, having tasted an alcoholic drink, having been drunk, and using prescription drugs for recreational purposes. However, changes were modest and engagement of 15–16-year-old adolescents with physical disabilities was similar to 11–12-year-olds in the general population. Analysis of associations between disability status and health risk behaviors while controlling for age and sex showed that disability is associated with a lower likelihood of having tried smoking, smoking, having tasted an alcoholic drink, drinking, having been drunk, having used drugs, having used prescription drugs for recreational purposes, and eating sweets; a higher likelihood of not engaging in physical exercise, not eating fresh produce, and eating high-fat foods; and non-significant for seat-belt use.

Conclusion: Health promotion programs about health risk behaviours designed for adolescents in the general population may not be appropriate for adolescents with physical disabilities.

Keywords: Adolescence – Physical disabilities – Health risk behaviors – Health promotion.

As part of a research program focused on health promotion for adolescents with physical disabilities we examine, in this paper, the changes that occur with age in tobacco use, alcohol use, drug use, physical activity, sedentary activity such as television watching, dietary habits, and seatbelt or wheelchair restraint use. In the general population, these behaviors are key foci for health promotion interventions for adolescents because their prevalence changes markedly during adolescence and some are implicated in morbidity and mortality from illnesses such as cancer and heart disease in adulthood.

Understanding engagement in health risk behaviors is also important for adolescents with physical disabilities because better medical treatment interventions have meant that many are surviving to adulthood. Thus, the same concerns about morbidity and mortality apply to them as well. In addition, there is concern that engagement in health risk behaviors may lead to the development of secondary conditions defined as disease, injury, functional limitation, disability, handicap, or impairment that occur any time in one's life when the primary disability is either a risk factor for that secondary condition or alters the usual intervention for prevention or treatment of any health condition (Turk et al. 1997b). Common secondary conditions include skin conditions, overweight, underweight, respiratory problems, muscle and joint pain, gastrointestinal problems, low self-esteem, lack of self-confidence, and depression (Appleton et al. 1994; Kircus & Brillhart 1990; Marge 1988; McDonough et al. 1995; Minchom et al. 1995; Moore & Polsgrove 1991; Motet-Grigoras & Schuckit 1986; Ogborne & Smart 1995; Patrick 1997; Patrick et al. 1997; Pope 1992; Pope & Tarlov 1991; Tam 1998; Turk et al. 1997a; Turner & Beiser 1990). Secondary conditions may, of course, also be related to difficulty obtaining medical services (Becker et al. 1989; Nosek et al. 1996), or to the broader social determinants of health including employment, housing or access to recreational activities (Irey et al. 1996; Kelly & Jessop 1996; Office for Disabled Persons Ontario 1988; 1990; U.S. Department of Health and Human Services 1991).

For adolescents without disabilities, cross-national population health survey research in Europe, Eastern Europe, and

Soz.- Präventivmed. 49 (2004) 132–141
0303-8408/04/020132–10
DOI 10.1007/s000038-004-3056-4

Table 1 Personal and technical assistance requirements of adolescents with physical disabilities (% respondents)

Task	Always	Sometimes	Never
Personal assistance[a]			
Feeding	5	7	88
Dressing	23	20	57
Grooming	18	17	65
Toileting	23	12	65
Bathing	26	19	55
Mobility	8	30	62
Technical assistance[b]			
Feeding	4	3	93
Dressing	7	6	87
Grooming	4	4	92
Toileting	24	9	67
Bathing	20	13	67
Mobility	34	20	46

[a] Assistance is needed from another person for these tasks
[b] Special equipment or techniques are used to perform these tasks

North America shows marked changes in the prevalence of health risk behaviors. There is a sharp increase in smoking, drinking alcohol and becoming drunk between 11 and 16 years of age. Engagement in physical activity tends to decrease, especially among girls. There is a decrease in the consumption of fruits, and a slight increase in the consumption of sweets (Currie et al. 2000; King et al. 1996).

Adolescents with physical disabilities are routinely excluded from mainstream health surveys and thus, relatively little is known about the prevalence and age-related differences of their health risk behaviors that is directly comparable with the general population. Steele et al. (1996) have reported that adolescents with physical disabilities such as cerebral palsy, spina bifida, and muscular dystrophy have a different overall profile of engagement in health risk behaviors than adolescents in the general population. They are less likely than their counterparts without physical disabilities to smoke, drink and use drugs. But, they are more likely to have unhealthy eating patterns, and engage in sedentary leisure activities such as watching television at the expense of regular physical exercise. Stevens et al. (1996) have reported that adolescents with physical disabilities have markedly more positive attitudes towards parents, teachers, and classmates.

The purpose of this study is to specifically examine age-related differences in the prevalence of engagement in health risk behaviors among adolescents with physical disabilities. From a public health and health promotion perspective understanding how prevalence changes with age, is fundamental to decisions about the content, timing and delivery strategy of health promotion interventions.

Method

This study is a special adjunct study to the 1993–1994 Canadian version of the Health Behavior in School-Aged Children: a WHO Cross-National Survey (HBSC) (Wold et al. 1994). The HBSC is a major international study of the health of 11–16-year-old adolescents, carried out at four-year intervals, in most countries in Europe, as well as in Canada, Greenland, Israel and the United States. The survey includes questions on health status, lifestyle behaviors, and psychosocial influences including family, peers, and school that have been tested across countries to ensure their psychometric properties. Sample selection and administration is guided by a common international protocol (Wold et al. 1994). Findings from each round of the survey have been published in a series of reports (Currie et al. 2000; King & Cole 1992; King et al. 1996).

Participants

The 1993–94 version of the HBSC study was administered to a national sample of adolescents across Canada and to a convenience sample of adolescents with physical disabilities. The national sample included 7020 adolescents from across Canada selected by means of cluster sampling with the cluster being the school class. Classes were randomly selected from each province in Canada.

The sample of adolescents with physical disabilities included 319 adolescents recruited through the Metropolitan Toronto School Boards and 16 of 19 treatment centers across the province of Ontario that comprise the Ontario Association of Children's Rehabilitation Services. This sample was a convenience sample, although the nature and proportion of different disabilities represented reflect what is seen in rehabilitation settings. The physical disability level was moderate to severe with respect to needs for assistance in daily living (Tab. 1).

In the absence of any centralized registry of adolescents with physical disabilities it was not possible to locate adolescents who are fully integrated in regular classrooms and who rarely, if ever, use services offered by the rehabilitation centers.

Table 2 shows that both the national sample and the sample of adolescents with disabilities had almost identical gender distributions, and similar age distributions. Other demographic information such as race or ethnicity was not collected in the HBSC survey.

Procedures for survey administration

Data for the national sample were collected through a mailed questionnaire administered by teachers during school hours in accordance with the HBSC international

protocol (Wold et al. 1994). Questionnaires were filled out during a 45-minute class. Students were informed that participation was voluntary, and that responses are anonymous. Survey administration for adolescents with physical disabilities required considerable adaptation to the recommended protocol. Consent was obtained from the medical or school staff, parents and the adolescents themselves. In Toronto, the HBSC questionnaire was administered by a research assistant while in treatment centers outside of Toronto, it was administered by personnel who had contact with the adolescents and their families. These personnel received detailed written instructions with telephone follow-up.

Surveys were administered in written, interview or interview-intervenor formats. The format was unknown for 3% (N = 11) of the participants. In the written format (N = 203, 64%), adolescents completed the survey independently in the same manner as adolescents without a physical disability. The interview format (N = 103, 32%) was developed for adolescents who had less than grade 6 reading level and/or whose motor skills did not permit them to mark their response. In this format, the survey administrator first read the question and possible responses and the participant then indicated the desired response verbally or by pointing. For participants unable to verbalize or point to their desired response, the responses to the question were read twice. The first reading was to familiarize the participant with the possible responses to the question. On the second reading, the participant would indicate the desired response, usually with an eye blink, or a nod. The response was read back for reconfirmation. The interview-intervenor format (N = 2, 0.6%) was developed for participants who communicate with the aid of an assistant. The procedure was the same as in the interview format except that during the second reading of the possible responses to the question participants relayed their response to an intervenor who then informed the survey administrator (Kalnins et al. 1999). Analyses by format showed some response bias. On 13 out of 106 HBSC survey questions (12%) statistically significant differences in response pattern showed that children using the interview format tended to present themselves in a more negative light (Kalnins et al. 1999) but the questions on which they did so did not cluster around a particular topic.

Measures of health risk behavior

Thirteen health risk behaviors from the HBSC were used in this study. These concerned tobacco use, alcohol use, drug use, physical activity, sedentary activity such as television watching, dietary habits, and seatbelt or wheelchair restraint use. Each variable was dichotomized into risk vs non-risk behavior. Tobacco use was assessed by asking participants if they had ever tried smoking cigarettes, cigars, or pipes (risk = "yes"; non-risk = "no"); and how often they smoked at present (risk = "every day", "at least once a week, but not every day", "less than once a week"; non-risk = "do not smoke"). Alcohol consumption was ascertained by asking participants if they have ever tasted an alcoholic drink (risk = "yes"; non-risk = "no"); how often they drink anything alcoholic (risk = "every day", "every week", "every month"; non-risk = "never", "less than once a month") and whether they had ever been drunk (risk = "yes, 2 times", "yes, 2–3 times", "yes, 4–10 times", "yes, more than 10 times"; non-risk = "no, never", "yes, once"). Experience with drug use was explored by asking how often participants had taken marijuana, hash, solvents, cocaine, heroin, or amphetamines (risk = "once or twice", "three times or more"; non-risk = "never") and whether they had used prescription drugs for recreational purposes (risk = "once or twice", "three times or more"; non-risk = "never"). With respect to physical activity participants were asked how often outside of school hours they exercised so much that they get out of breath or sweat (risk = "never", "less than once a month", "once a month", "once a week"; non-risk = "2–3 times a week", "4–6 times a week", "every day"). Sedentary leisure activities were assessed by asking how many hours a day are usually spent watching television (risk = "4 hours a day", "more than 4 hours a day"; non-risk = "2–3 hours a day", "between a half and one hour a day", "less than a half hour a day", "none"). Dietary habits were assessed by asking respondents how often they consumed 1) fresh produce such as fruit or raw vegetables, 2) fatty foods such as potato chips or french fries, or 3) sweets such as candy, chocolate bars, and soft drinks with sugar (risk = "once a day", "more than

Table 2 Demographic and personal characteristics of the study samples

Variable	Physical disabilities % (n)	National % (n)
Gender		
Males	51 (162)	48 (3 350)
Females	49 (157)	52 (3 644)
Age groups		
11–12 years	28 (88)	24 (2 369)
13–14 years	33 (106)	33 (2 341)
15–16 years	39 (125)	33 (2 310)
Disability		
Spina Bifida	36 (114)	–
Cerebral Palsy	34 (108)	–
Muscular Dystrophy	10 (33)	–
Amputee or congenital limb deficit	3 (10)	–
Arthritis	3 (11)	–
Other[a]	11 (32)	–
Non-response	3 (11)	

[a] Includes Charcot Marie tooth atrophy, arthrogryposis, ataxia telangiectasia, stroke and brain tumors

Table 3 Age-related differences in health risk behaviors of adolescents with physical disabilities and adolescents in a national sample (% respondents)

Variable	Age (years)			χ^2_{trend}
	11–12	13–14	15–16	
Tried smoking (at least once)				
Physical disabilities (n = 318)	2.3	17.9	20.0	11.90***
National (n = 6 999)	18.8	44.7	61.7	882.68***
Smoke (daily, once per week, less than once per week)				
Physical disabilities (n = 318)	1.1	4.8	8.0	5.11*
National (n = 7 005)	6.1	21.8	32.6	510.76***
Tasted alcohol (at least once)				
Physical disabilities (n = 311)	46.4	62.5	69.1	10.30***
National (n = 6 998)	71.7	85.7	94.3	439.74***
Use alcohol: beer, wine or liquor (every day, week or month)				
Physical disabilities (n = 289)	0.0	9.8	5.5	1.90^{ns}
National (n = 6 845)	10.5	23.3	45.5	727.92***
Been drunk (more than once)				
Physical disabilities (n = 317)	0.0	1.0	5.6	7.12**
National (n = 7 003)	2.9	14.4	39.1	1002.36***
Used drugs: marijuana, hash, solvents, etc. (at least once)				
Physical disabilities (n = 210)	–	4.6	7.4	0.71^{ns}
National (n = 4 601)	–	16.8	32.4	151.78***
Used prescription drugs for recreational purposes (at least once)				
Physical disabilities (n = 214)	–	0.0	4.9	21.72*
National (n = 4 601)	–	7.4	7.9	0.66^{ns}
Physical activity (exercise once per week or less)				
Physical disabilities (n = 315)	50.6	64.4	64.5	3.72^{ns}
National (n = 7 004)	24.0	24.8	32.1	38.44***
Watch television (four hours per day or more)				
Physical disabilities (n = 317)	45.4	46.2	37.6	1.46^{ns}
National (n = 6 994)	27.7	26.7	20.7	30.91***
Eat fresh produce: fruit and vegetables (less than once a day)				
Physical disabilities (n = 318)	77.0	76.4	70.4	1.30^{ns}
National (n = 6 985)	56.6	57.6	60.3	6.67**
Eat high-fat foods: french fries or potato chips (once or more per day)				
Physical disabilities (n = 313)	30.7	26.4	36.8	1.06^{ns}
National (n = 6 972)	24.4	23.4	19.8	13.84***
Eat sweets: candy, chocolate bars, or soft drinks (once or more per day)				
Physical disabilities (n = 318)	54.0	55.7	66.4	3.61^{ns}
National (n = 6 986)	76.7	84.2	83.1	32.04***
Use seat belt or wheelchair restraint (sometimes or never)				
Physical disabilities (n = 313)	10.5	14.6	10.5	0.01^{ns}
National (n = 6 972)	10.5	14.1	12.1	3.06^{ns}

ns: non-significant, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

once a day"; non-risk = "never", "seldom", "at least once a week, but not every day"). Participants were also asked about the frequency with which they used seat belts and wheelchair restraints (risk = "seldom or never", "sometimes"; non-risk = "often", "always").

Statistical analysis

Analyses were performed using SAS statistical software version 8.2. Within each sample, chi-square tests for trend were conducted for each health risk behavior across age groups. The association between disability and health risk behaviors was examined using logistic regression analyses. Each health risk behavior was treated as an outcome in separate regression analyses. Each model included disability status as the main predictor and controlled for age group and sex. Odds ratios were derived by taking the exponentiation of the disability parameter estimate, and Wald Chi-square statistics were used to determine statistical significance of the disability parameter.

Results

Table 3 shows the percentage of adolescents in each sample by age group who engage in the health risk behaviors included in this study. A gender breakdown is not shown because of small cell sample sizes. The association between

Table 4 Association between disability status and health risk behaviors: results from logistic regressions controlling for age and sex

Outcome	Disability OR	95% CI
Tried smoking (at least once)	0.19	0.14–0.26
Smoke (daily, once per week, less than once per week)	0.18	0.11–0.30
Tasted alcohol (at least once)	0.23	0.18–0.30
Use alcohol: beer, wine or liquor (every day, week or month)	0.13	0.08–0.22
Been drunk (more than once)	0.08	0.04–0.17
Used drugs: marijuana, hash, solvents, etc. (at least once)	0.18	0.10–0.32
Used prescription drugs for recreational purposes (at least once)	0.35	0.15–0.79
Physical activity (exercise once per week or less)	4.50	3.55–5.72
Watch television (four hours per day or more)	2.28	1.81–2.87
Eat fresh produce: fruit and vegetables (less than once a day)	2.04	1.58–2.64
Eat high-fat foods: french fries or potato chips (once or more per day)	1.62	1.27–2.07
Eat sweets: candy or soft drinks (once or more per day)	0.32	0.25–0.41
Use seat belt or wheelchair restraint (sometimes or never)	0.94	0.66–1.34

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

disability status and risk behaviors while controlling for age and sex are presented in Table 4. The behaviors are grouped to highlight, a) health risk behaviors having a lower likelihood of occurrence among adolescents with physical disabilities than among those without disabilities; b) a greater likelihood of occurrence, or c) show no difference in likelihood of occurrence.

Health risk behaviors having a lower likelihood of occurrence among adolescents with physical disabilities than among those without disabilities

Use of tobacco: Table 3 shows a statistically significant difference between age groups in both samples in the number of adolescents who reported having tried smoking ($\chi^2_{trend} = 11.90$, $p < 0.001$ for the physical disabilities sample; $\chi^2_{trend} = 882.68$, $p < 0.001$ for the national sample). However, in each age group, the percentage of adolescents with physical disabilities who have tried smoking is much lower than in the national sample. Among 15–16-year-olds, having tried smoking is three times lower (20.0% vs 61.7% respectively). In addition, experimentation with smoking is delayed. The 20% of 15–16-year-olds with physical disabilities that have ever smoked approximately equals the percentage of 11–12-year-olds in the national sample that reported the same behavior. The odds of ever having tried smoking are 81% lower among disabled adolescents as compared to their non-disabled peers (OR: 0.19, 95% CI [0.14, 0.26]).

A similar relationship is present when comparing disability status in relation to smoking. In both samples there is a significant age-related increase in smoking prevalence. Smoking increases by 7% among adolescents with physical disabilities ($\chi^2_{trend} = 5.11$, $p < 0.05$). In contrast, in the national sample smoking increases by 27% between 11 and 16 years of age ($\chi^2_{trend} = 510.76$, $p < 0.001$). Again, the percentage of 15–16-year-olds with physical disabilities who smoke approximates the percentage of 11–12-year-olds in the national sample who smoke. The odds of smoking are 82% lower among adolescents with physical disabilities (OR: 0.18, 95% CI [0.11, 0.30]).

Use of alcohol: In both samples, the likelihood of having tasted an alcoholic drink increases significantly by age group ($\chi^2_{trend} = 10.30$, $p < 0.001$ for the physical disabilities sample; $\chi^2_{trend} = 439.74$, $p < 0.001$ for the national sample). The odds are significantly smaller for adolescents with physical disabilities than those for adolescents without disability (OR: 0.23, 95% CI [0.18, 0.30]).

A significant age-related increase in frequency of alcohol consumption is only seen for the national sample ($\chi^2_{trend} = 727.92$, $p < 0.001$). The proportion of adolescents using alcohol is markedly and significantly lower among adolescents with physical disabilities than in the national sample (OR: 0.13, 95% CI [0.08, 0.22]). The highest percentage of drinkers among adolescents with physical disabilities (9.8% among 13–14-year-olds) corresponds approximately to the proportion of regular drinkers among 11–12-year-olds (10.5%), the youngest age group, in the national sample. Moreover, the odds of having been drunk are significantly lower among adolescents with a physical disability than those in the national sample (OR: 0.08, 95% CI [0.04, 0.17]).

Use of drugs: Adolescents in the two oldest age groups were questioned about their use of hashish or marijuana (e.g., hash, grass), solvents (e.g., glue sniffing), cocaine, crack, heroin, opium, morphine, and amphetamines (e.g., uppers, speed), or LSD (e.g., acid). Table 3 shows that illegal drug use increases significantly by age group among adolescents in the national sample ($\chi^2_{trend} = 151.78$, $p < 0.001$) but not among adolescents with physical disabilities. After age and sex adjustment, the level of usage is over five times lower

among adolescents with physical disabilities (OR: 0.18; 95% CI [0.10, 0.32].

Adolescents, aged 13 years or older, were also queried about their use of prescription drugs for recreational purposes (e.g., tranquilizers such as Valium or sedatives such as Seconal). The percentage of adolescents in the national sample who abused prescription drugs remains constant at about 7% to 8%. Among adolescents with physical disabilities there is a significant increase between 13 and 16 years of age ($\chi^2_{trend} = 21.72$, $p < 0.031$). Nonetheless, in comparison to the national sample, the odds of having used prescription medicines for recreational purposes are marginally significantly lower (OR: 0.35; 95% CI [0.15, 0.79]).

Health risk behaviors having a higher likelihood of occurrence among adolescents with physical disabilities than among those without disabilities

Engagement in physical and leisure activity: Table 3 shows that in both samples, infrequent exercise, shows age-related increases, but the increase is significant only in the national sample ($\chi^2_{trend} = 38.44$, $p < 0.001$). However, the odds of exercising once per week or less were 4.5 times higher among adolescents with physical disabilities (OR: 4.50, 95% CI [3.55, 5.72]). In addition, adolescents with physical disabilities were twice as likely as their non-disabled peers to report sedentary activity such as watching television for more than four hours per day (OR: 2.28, 95% CI [1.81, 2.87]).

Dietary habits: Among adolescents with physical disabilities there were no significant differences between age groups in eating behavior. In contrast, among adolescents in the national sample there was a significant increase by age group in the infrequent consumption of fresh produce ($\chi^2_{trend} = 6.67$, $p < 0.01$), a decrease in the consumption of high-fat foods ($\chi^2_{trend} = 13.84$, $p < 0.001$) and an increase in eating sweets ($\chi^2_{trend} = 32.04$, $p < 0.001$). In comparison to the national sample, adolescents with physical disabilities have a lower likelihood of eating fresh produce (OR: 2.04, 95% CI [1.58, 2.64]) but a higher like-lihood of eating high-fat foods (OR: 1.62, 95% CI [1.27, 2.07]). However, adolescents with physical disabilities were less likely to report eating sweets such as candy or soft drinks one or more times per day (OR: 0.32, 95% CI [0.25, 0.41]).

Health risk behaviors showing no significant differences in likelihood of occurrence among adolescents with physical disabilities than among those without disabilities

Use of a seat belt or wheelchair restraint: There were no significant age-related trends in seat belt or wheelchair restraint use in either sample. Approximately 10% to 14% of both samples reported "sometimes" or "never" using restraints.

Discussion

The age-related profile of engagement in health risk behaviors among 11–12, 13–14 and 15–16-year-old adolescents with physical disabilities is different from that of adolescents in the general population. Statistically significant age-related differences were found for having tried smoking, smoking, having tasted an alcoholic drink, having been drunk, and using prescription drugs for recreational purposes. However, the age-related increases in the frequency of occurrence of these behaviors were modest and the level of engagement among 15–16-year-old adolescents with physical disabilities tended to approximate the level among 11–12-year-olds in the general population.

Analysis of associations between disability status and health risk behaviors while controlling for age and sex showed that adolescents with a physical disability are less likely to: have tried smoking, smoke, have tasted an alcoholic drink, drink, have been drunk, use drugs, use prescription drugs for recreational purposes, and eat sweets. They are more likely not to adopt health behaviors that enhance health such as regular physical exercise, eating of fresh produce and avoidance of high-fat foods. There is no significant difference between adolescents with and without physical disabilities in frequency of seat belt use.

Our finding of lower levels of engagement in behaviors related to substance use is in contrast to reports by Hogan, McLellan, and Bauman (2000) who, from a population study, using questions from the same questionnaire used in this study, report that students with disabilities are more likely to smoke cigarettes, drink alcohol and become drunk than other students. This discrepancy may reflect a difference in study samples. Our sample included only adolescents with diagnosed physical disabilities. The study by Hogan and colleagues included all respondents who indicated, on an open-ended population health survey question, that they had a disability of some kind. Thus the range of disabilities included may have been broader or of a different degree of severity. The discrepancy implies that to fully understand the associations between disability and health risk behavior, future research must carefully describe the participants with respect to both the type and severity of their disabilities.

Our finding of low levels of engagement in behaviors related to substance abuse, even by 16 years of age, represents a positive strength for health maintenance for adolescents with physical disabilities. A key underlying factor may be the high level of supervision that adolescents with physical disabilities experience. Margalit (1981), for example, reported that adults usually organised and controlled the social activities of adolescents with cerebral palsy. Additional factors

that may restrain adolescents with physical disabilities from substance abuse may be the lack of opportunity arising from mobility or financial constraints. It may also be that adolescents deliberately avoid engaging in risk behaviors for fear of exacerbating their physical condition or interfering with their medications.

Although the low level of engagement in tobacco, alcohol, and drug use during adolescence is heartening, the sparse literature on adults with physical disabilities suggests that in adulthood, smoking, alcohol and drug use is the same as it is in the general population (Motet-Grigoras & Schuckit 1986). This catch-up suggests that health promotion initiatives around tobacco, alcohol and drug use need to be implemented with adolescents with physical disabilities as they approach the transition to adulthood rather than in early adolescence.

Our finding that a high proportion of adolescents with physical disabilities do not engage in physical activity is disturbing in the light of literature that links lack of physical activity with secondary conditions and the risks of heart disease in adulthood (Eaton et al. 1995), poor mental health (Paluska & Schwenk 2000), and lower functional capacity and quality of life (Marge 1988; Pope 1992; Pope & Tarlov 1991; Turk et al. 1997a). Although physical activity is important, it may present formidable challenges to young people with physical disabilities and their families because of lack of facilities, difficulty accessing available facilities, or difficulties obtaining personal assistance in order to engage in sports. Attitudinal factors may also be important. Physical exercise may remind children with physical disabilities of their past or current rehabilitation or medical regimens. Wilhite et al. (1997) have noted that in comparison with adolescents without disabilities, adolescents with disabilities were less likely to agree that it was important for them to participate in sports and active leisure activities. It is also possible that the standards typically applied to physical activity among adolescents in the general population with respect to type, frequency, and duration of physical activity are inappropriate for adolescents with physical disabilities. These issues need clarification before attempts are made to develop health promotion interventions.

Examination of patterns of eating behavior revealed that adolescents with physical disabilities are at higher health risk because they eat fresh fruit and vegetables less frequently and they tend to eat more fatty foods, although they eat sweets less often. The profiles of dietary habits among adolescents with physical disabilities, when coupled with low levels of physical activity, are worrisome because of their possible contribution to obesity. Among children and adolescents with spina bifida, body weight is considered to be an important factor associated with limited ambulation or its cessation altogether (Mita et al. 1993; Williams et al. 1999). From clinical practice it is known that adolescents with physical disabilities may avoid eating fresh produce because of difficulties with chewing and swallowing and that high-fat foods, such as french fries and potato chips, are manageable as finger foods. Thus, nutrition counselling that includes the whole family should be an important component of treatment and health promotion for adolescents with physical disabilities.

Our finding that at age 12–13, 14% of adolescents with physical disabilities do not use seat belts or wheelchair restraints is disturbing because injuries sustained in motor vehicle accidents are a major cause of mortality and morbidity in adolescence (Canadian Institute of Child Health 1994). Furthermore, seat belt use is mandated by Ontario law and is enforced by fines and refusal by insurance companies to pay claims if a restraint was not used. These findings suggest that health promotion interventions should be addressed at adolescents and parents because adolescents with physical disabilities may need adult help to attach a seat belt or wheelchair restraint.

Overall, the picture presented is that the levels of engagement in health risk behaviors are low among adolescents with physical disabilities in comparison to those without physical disabilities. Thus, from a traditional public health perspective that focuses on mortality and morbidity, especially in adulthood, these adolescents do not appear to be at risk. However, even low levels of engagement may pose particular risks given the special vulnerabilities of adolescents with physical disabilities, particularly with respect to the development of secondary conditions. Thus, for example, lack of physical exercise and physical movement takes on a special meaning if one considers that adolescents with physical disabilities who may have limited sensation are prone to skin sores, decubitus ulcers and pressure sores. Diets high in fats may contribute to obesity which in turn is detrimental to mobility. Research with adolescents using number of secondary conditions as the outcome, has shown that, behavioral, rather than medical or physical factors contribute most to the presence of secondary conditions (Lollar 2001).

Although we have shown that there are marked differences in the profiles of health risk behaviors among adolescents with physical disabilities and their peers in the general population, it is important to recognize limitations of our work. Some bias may exist due to the sample selection process. Our sample of adolescents with physical disabilities was a convenience sample of adolescents because random sampling of this population is not possible since no central registry exists. The sample included adolescents whose disabilities

would be considered by clinicians to be moderate to severe. Furthermore, our sample size did not permit us to explore differences by gender, type of disability and severity of disability. The HBSC surveys have consistently reported gender differences (Schmidt 1999).

Despite limitations, one implication of our findings is that health promotion programs about health risk behaviors that have been designed for adolescents in the general population may not be appropriate in content or timing for adolescents with physical disabilities given their different pattern of engagement. Another implication is that to devise appropriate health promotion interventions for adolescents with physical disabilities research is needed on the perceptions youth with physical disabilities hold about health risk behaviors, and the role such behaviors play in their lives. In addition, research is needed on understanding the associations between health risk behaviors and the experiences adolescents with physical disabilities have with peers, family and school.

Acknowledgements

This research was funded in part by the Bloorview Childrens Hospital Foundation and the Easter Seal Research Institute. We are indebted to the adolescents who participated in our survey and for assistance in survey administration received from the Easter Seal Society, Metropolitan Toronto school system, the treatment centers of the Ontario Association of Children's Rehabilitation Services, and in particular, the Bloorview MacMillan Centre. We thank Mary Johnston at Health Canada and Alan King, Wendy Warren, and Matt King at the Social Program Evaluation Group at Queen's University for permission to use the 1993–1994 Canadian data set from the Health Behaviors in School-aged Children: a WHO Cross-National Survey (HBSC). The WHO regional office in Europe has adopted the HBSC as a WHO collaborative study. International coordinators of the 1993–1994 study were Chris Smith, Health Promotion, Wales, and Bente Wold, University of Bergen, Norway. We are very much indebted to Charles Victor for statistical advice and analyses.

Zusammenfassung

Altersabhängige risikoreiche Gesundheitsverhaltensweisen von Jugendlichen mit körperlicher Behinderung

Fragestellung: Die Untersuchung von altersbedingten Unterschieden in für die Gesundheit risikoreichen Verhaltensweisen bei 11- bis 16-jährigen Jugendlichen, die eine körperliche Behinderung aufweisen.

Methode: Die Angaben in einem Fragebogen zum Gesundheitsverhalten von 319 Jugendlichen mit körperlicher Behinderung und von 7 020 Jugendlichen ohne körperliche Behinderung wurden verglichen.

Ergebnisse: Signifikante altersbedingte Unterschiede im Experimentieren mit dem Rauchen, im Rauchen, in der ersten Erfahrung mit Alkoholkonsum, in der Trunkenheit und im Missbrauch von Medikamenten konnten gezeigt werden. Die Altersunterschiede sind jedoch bescheiden und 15- bis 16-jährige Jugendliche mit körperlicher Behinderung sind mit 11- bis 12-Jährigen der Grundgesamtheit vergleichbar. Nach der Kontrolle des Alters und des Geschlechts sind die Zusammenhänge zwischen dem Vorhandensein einer körperlichen Behinderung und einem gesundheitlichen Risikoverhalten signifikant. Vergleichen mit der Grundgesamtheit ergibt sich für Jugendliche mit Behinderung eine geringere Wahrscheinlichkeit zum Experimentieren mit dem Rauchen, zum Rauchen, zur ersten Erfahrung mit Alkoholkonsum, zur Trunkenheit, zum Drogenkonsum, zum Missbrauch von Medikamenten und zum Essen von Süssigkeiten. Sie haben hingegen eine höhere Wahrscheinlichkeit zur körperlichen Inaktivität, zum Verzicht auf den Verzehr von Frischprodukten und zum Konsum von fettreichen Speisen. Keine Unterschiede wurden in der Benutzung des Sicherheitsgurtes gefunden.

Schlussfolgerung: Für Jugendliche in der Allgemeinbevölkerung entwickelte Gesundheitsförderungsprogramme scheinen für den Einsatz bei Jugendlichen mit körperlicher Behinderung nicht angemessen zu sein.

Résumé

Age et comportements à risque d'adolescents atteints ou non d'handicap physique

Objectifs: Etudier les différences dues à l'âge dans les comportements à risque d'adolescents de 11–12 ans, 13–14 ans et 15–16 ans souffrant ou non d'un handicap physique.

Méthodes: Analyse des données d'une enquête de santé réalisée parmi 319 adolescents avec un handicap physique et 7020 adolescents tiré d'un échantillon national.

Résultats: Des différences significatives relatives à l'âge des comportements à risque ont été observées entre les deux groupes pour: avoir fumé au moins une fois, fumer, avoir déjà bu de l'alcool, avoir été ivre et consommer des drogues prescrites par un médecin pour un usage récréatif. Cependant, les différences sont faibles et les adolescents handicapés de 15–16 ans ont des comportements similaires à ceux de 11–12 ans sans handicap. Les associations (odds ratio ou rapports de cote) entre le fait d'avoir ou non un handicap et les comportements de santé, une fois les données contrôlées pour l'âge et le sexe montrent que les adolescents avec un handicap physique ont une probabilité plus faible d'avoir déjà fumé, de fumer, d'avoir consommé de l'alcool, de boire de l'alcool, d'être ivre, de consommer des drogues, de consommer des drogues prescrites par un médecin pour un usage récréatif, de consommer des bonbons et autres sucreries. Ces mêmes jeunes ont une probabilité plus élevée de ne pas faire d'exercice physique régulièrement, de ne pas consommer de produits frais et de consommer des produits riches en graisse. Aucune différence statistiquement significative n'ont été observées en ce qui concerne l'utilisation de la ceinture de sécurité.

Conclusion: Les programmes de promotion de la santé concernant les comportements à risque pour la santé développés pour la population générale d'adolescents peuvent ne pas être appropriés pour les adolescents avec un handicap physique.

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