



ORIGINAL RESEARCH PAPER

Health-Related Behaviors of Sudanese Adolescents

ME Moukhyer¹, JT van Eijk², NK De Vries², H Bosma²

¹Ahfad University for Women, Omdurman, Sudan

²Maastricht University, Maastricht

Published: 21 April 2008

Moukhyer ME, van Eijk JT, De Vries NK, Bosma H

Health-Related Behaviors of Sudanese Adolescents

Education for Health, Volume 21, Issue 1, 2008

Available from: <http://www.educationforhealth.net/>

ABSTRACT

Context: Adolescence is the age period from 10-19 years when lifestyle patterns of behavior are being formed. These behaviors set the stage for future health problems. Behaviors and lifestyles are determinants of future health, illness, disability, and premature mortality.

Objectives: To gain new insight into health behaviors, lifestyles and their context in adolescents in order to assess the determinants and barriers to the improvement of health.

Methods: A cross-sectional descriptive study. A random sample of 1200 adolescents within the age group of 10-19 years (53.2% girls and 46.8% boys) were interviewed individually. A self-reported questionnaire was developed for data collection by trained interviewers. Bivariate and logistic regression analyses were conducted.

Outcomes: The overall prevalence of smoking among adolescents was 4.9%. More boys (9.1%) than girls (1.3%) reported smoking. Older participants and those with higher levels of education reported higher rates of tobacco use (10.4 % and 7.9%). Consumption of alcohol was significantly more common for boys (2.3%). More boys than girls reported they were actively engaged in sports. Inactivity was significantly higher among older age groups and was associated with lack of education. 58% of girls and 8.7% of boys were physically inactive. More than half of the boys go hungry due to lack of availability of food in the house and this was somewhat less common for girls (43%). Adolescents 16 years and older reported significantly less consumption of both nutritious and non-nutritious foods than other age groups.



Conclusion: Our research contributed to greater understanding of current health-related behaviors of Sudanese adolescents. There are a number of implications for potential interventions (e.g. physical inactivity of girls and hunger experiences).

Keywords: Health, adolescents, Sudan

Introduction

Adolescence is the period during which lifestyle patterns of behavior are being formed (WHO, 1997). These behaviors set the stage for future health problems, and the risk-taking and health-compromising lifestyles are viewed as crucial determinants of future health, illness, disability, and premature mortality (Hansell et al., 1999; Aarons et al., 1999). Overall, it has been estimated that 40% of premature deaths in developing countries, and 70 to 80% in developed countries, are attributable to many behaviors that begin in adolescence (WHO, 1995). The most important behaviors that impact on health are considered to be smoking, alcohol consumption, dietary habits and physical inactivity. Studies indicate that there is an increase in the use of tobacco and alcohol among young people in developing countries, where restrictions on advertising and access are often weaker than in industrialized countries.

Childhood and adolescence are also important times for establishing healthy dietary habits. Maintaining healthy eating patterns remains important as children grow into adolescents. When young people are hungry or undernourished, they have difficulty resisting infection and therefore are more likely to become sick, miss school and fall behind in class. They are irritable and have difficulty concentrating, which can interfere with learning, and they have low energy, which can limit their physical activity (Miles & Eid, 1997). In countries where food is not always plentiful, dietary habits are shaped by the availability of food, rather than choice of food with nutritious value. This drive to consume whatever food is available can lead to indiscriminate choices.

Another factor in the dietary behavior of Sudanese is the habit of drinking tea. Particularly after meals this is widespread among Sudanese, regardless of gender, social class or age. The nutritional impact derives from the fact that tea leaves contain a substance (tannic acid), which inhibits the absorption of dietary iron (Southgate, 1993). The habit of drinking tea after meals is clearly problematic for adequate iron intake.

In the past 20 years, several large, long-term studies of adults have shown that physical inactivity is a major risk factor for morbidity and premature mortality from coronary heart diseases (CHD) (Leon et al., 1987; Powell et al., 1987). In fact, the World Health Organization (WHO) has recognized physical inactivity as a major threat to worldwide population health. Regular physical activity can benefit young people as well (Sallis & Faucett, 1992). Since risk-factor levels in childhood predict levels in young adulthood (Cresanta et al., 1986), a decrease of activity in young people can have significant implications for those individuals as they age. In addition to benefits related to the prevention of CHD, physical activity appears to promote mental health in adults (Taylor et al., 1985) and enhance self-esteem in young people (Gruber, 1986). Physical activities and sports, as well as other important types of health behavior constitute important socialization areas for young people (Kenyon & McPherson, 1973). To date, there are no available data about Sudanese adolescent's physical activity.

This paper focuses on the health-related behaviors of Sudanese adolescents and aims to gain new insight into health behaviors, lifestyles and their context in these young people, in order to assess determinants and barriers to positively have an impact on health-related behaviors. A second objective of this paper is to contribute to the design of interventions to improve the health of



this adolescent group. Finally, data from this study may be used to advocate to policymakers on the needs of this generally overlooked population group. In this paper, we will compare adolescents' self-reported health behaviors by gender, age, and educational group.

Methods

Design and population

The health profile of Sudanese adolescents was assessed in a cross-sectional, cluster random sampling survey study. The specific population selected for the study included adolescents from the Umbada community aged 10-19 years. Umbada was selected because its population is multi-ethnic, comprising people from different regions and tribes of Sudan. Umbada is a suburban area of Khartoum, the capital city of Sudan where the majority of people are of middle and low socio-economic status.

Sample size

A random sample of four blocks from the total 38 blocks of Umbada was drawn. Households were selected by systematic random sampling starting from the center of each block (every fifth house). All adolescents found in the households were interviewed, until the number needed in each block was reached. If refused, the method was adjusted by using substitute techniques, adding +2 or -2 to the selected number in the house. We selected 300 adolescents from each block. A total sample of 1200 adolescents (53.2% girls and 46.8% boys) were interviewed.

Data collection

Data were collected during the period July-November 2001 as part of a study on the health profile of Sudanese adolescents. The data collection was done with the help of trained interviewers from the Ahfad University for Women and the Community Animators Friendly Association (CAFA) of the Umbada community.

Before data collection, an introductory statement was first read by the interviewer to the head of the household to obtain his/her verbal consent. The same statement was presented to the adolescents as well, before interviewing commenced.

Measurement

Data were collected using structured questionnaires to obtain information on smoking, alcohol use, eating habits, and physical activity. Trained interviewers were instructed to carry out the interviews in total privacy without the presence of adolescent respondents' parents or other family members.

Smoking habits were measured by asking one question to the respondents: "Have you ever tried smoking a cigarette?" There were three possible responses: "I have never"; "Yes, but I quit smoking"; "Yes, I smoke currently." The last two responses were combined to distinguish those who tried smoking and currently smoke, from those who do not smoke.

With respect to alcohol, respondents were asked one question: "Do you drink alcohol?" and the two possible responses, were "no" or "yes."



Physical exercise was assessed by the answer of yes or no to the question: “Do you do any sports?” The additional follow-up questions were: “If yes, what type of sport? Where do you play this sport?”

Participants were asked to indicate the frequency of eating or drinking from a list of food items: fruit, raw vegetables, cooked vegetables, Coke or other soft drinks that contain sugar, sweets, potato crisps, meat, salty foods, tea, and bread. Respondents could provide one of the following six responses: “never”, “less than once a day”, “once a day”, “more than once a day”, “once a week”, “more than once a week” (King et al., 1998). The two response categories of “more than once a day” and “once a day” were combined to derive a frequency of daily consumption for each item in contrast with the other four categories, which represented infrequent use. The responses of adolescents about food and drink items were further divided in two categories: nutritious (healthy) foods which included fruit, vegetables (raw vegetables and cooked vegetables combined together), meat and bread and non-nutritious (unhealthy) foods which included Coke or other soft drinks containing sugar, sweets, potato crisps, salty foods, and tea (El-tawila et al., 1999).

The respondents were also asked, “How often are you hungry because there is not enough food in the house?” There were three possible answers: “never/hardly ever,” “sometimes,” and “a lot.” The second and third responses were combined to distinguish those who go hungry because there is not enough food in the house from those who said never/hardly ever.

Socio-demographic variables in the study included gender, the age groups 10-12, 13-15 and 16 and older, and educational level, grouped into the three categories of having no education, basic education, or secondary education and above.

Analysis

Analysis was done using the statistical software package SPSS version 13.

First, analyses were performed for the separate health-related behavior variables to test the association with gender, education level and age group. We used bivariate analysis (cross-tabulations) and chi-square statistics to test the significance of the associations between the dependent and independent variables and to 0.05 (2-sided) was used to understand the relationship, if any, between variables. P used to determine significance.

Second, logistic regression was used separately for each dependent variable with all independent demographic variables (gender, age group and education level) as predictors to assess the degree of association using odd ratios (OR) with 95% confidence intervals (CI). Logistic regression was used in this paper for simultaneous analysis, which could not be done by cross-tabulation and chi-square alone.

Results

Table 1 shows that the overall prevalence of smoking among adolescents is 4.9%, with more boys (9.1%) than girls (1.3%) reporting smoking. More older participants (10.4%) reported tobacco use, as well as those with a higher level of education (7.9%).



Drinking was significantly more common for boys (2.3%) although modest in reported prevalence. It was slightly more frequently reported by those in the older age group (1.8%) than the younger (1.1%) and by those with no education (2.9%) compared to those with education (1.2%).

More boys (92.3%) than girls (41.7%) reported that they were actively engaged in sports activities. Inactivity was significantly higher among older age groups (43.8%) and was associated with no education (52.9%). Over 40% of those who were actively involved in sports were playing football (soccer); 23.8% of their activities were done at home and 17.5% in neighborhood streets.

Table 1 also reveals that more than half of the boys went hungry because there is not enough food in the house, this was somewhat less common for girls. Experiences of hunger were equally prevalent among different age groups and education levels.

Table 1: Percentage of adolescents who are currently smoking, drinking alcohol, who are physically inactive and are experiencing hunger by background characteristics (n=1200)

	(n)	Nutritious (healthy) foods				Non-nutritious (unhealthy) foods				
		Fruit	Vegetables	Meat	Bread	Soft drinks	Sweet	Crisps	Salty food	Tea
		%	%	%	%	%	%	%	%	%
Gender										
Male	562	33.5	70.1	55.7	96.2	43.9	55.4	38.7	42.9	91.0
Female	638	31.9	69.7	60.7	97.4	44.8	60.6	39.2	32.0*	84.6*
Age Groups										
10-12	378	36.0	70.9	57.0	97.8	44.9	60.8	40.4	40.1	92.2
13-15	429	31.8	73.0	61.1	97.1	40.4	64.3	39.5	37.4	86.7
16+	393	30.3	65.6	56.8	95.6	48.2	48.8	36.9	33.9	83.6
Education Level										
No education	34	50.0	61.8	67.6	88.0	42.4	48.5	39.4	48.5	79.4
Basic	819	31.9	70.1	57.5	97.8	42.6	58.3	40.4	37.7	89.4
Secondary +	347	32.7	70.3	59.6	95.5*	48.8	58.7	35.5	34.5	84.2
Total	1200									

Table 2 shows that a third of the adolescent boys and girls ate fruits. The older group reported lower fruit consumption (30.3%). Half of those with no education reported eating fruits on a daily basis and more than half of all subgroups reported consumption of vegetables.

Meat consumption was equally prevalent among all subgroups. Bread consumption was significantly less for those with no education (88.0%) compared to those with above secondary (95.5%) and basic education (97.8%). Nearly 50% of adolescents reported eating more than two nutritious food items on a daily basis.

Table 2 also shows that the consumption of soft drinks was equally reported among subgroups. Differences of daily consumption of sweets between boys (55.4%) and girls (60.6%) were small. However, daily consumption of sweets was significantly lower (48.8%) for the age group 16 years and older. Potato crisps consumption was equally reported among all subgroups: for boys 38.7% and 39.2% for girls. Those with basic education consumed more (40.4%) than those with no education (39.4%) and those above secondary education (35.5%). Boys consumed significantly more salty foods than girls, with consumption reported less frequently in relation to older age and higher education level.



Most adolescents reported drinking tea, although significantly more boys (91.0%) than girls (84.6%) indicated tea consumption, especially in the youngest age group (92.2%). Those with no education drank less tea (79.4%) compared to those with basic (89.4%) and above secondary education (84.2%).

Table 2: Percentage of respondents who reported daily consumption of different types of food by background characteristics (n=1200)

	(n)	Nutritious (healthy) foods				Non-nutritious (unhealthy) foods				
		Fruit	Vegetables	Meat	Bread	Soft drinks	Sweet	Crisps	Salty food	Tea
		%	%	%	%	%	%	%	%	%
Gender										
Male	562	33.5	70.1	55.7	96.2	43.9	55.4	38.7	42.9	91.0
Female	638	31.9	69.7	60.7	97.4	44.8	60.6	39.2	32.0*	84.6*
Age Groups										
10-12	378	36.0	70.9	57.0	97.8	44.9	60.8	40.4	40.1	92.2
13-15	429	31.8	73.0	61.1	97.1	40.4	64.3	39.5	37.4	86.7
16+	393	30.3	65.6	56.8	95.6	48.2	48.8	36.9	33.9	83.6
Education Level										
No education	34	50.0	61.8	67.6	88.0	42.4	48.5	39.4	48.5	79.4
Basic	819	31.9	70.1	57.5	97.8	42.6	58.3	40.4	37.7	89.4
Secondary +	347	32.7	70.3	59.6	95.5*	48.8	58.7	35.5	34.5	84.2
Total	1200									

p<.05

Table 3 displays odds ratios and unstandardized regression coefficient with 95% confidence intervals for the association between health-related behaviors and demographic characteristics. Smoking prevalence was lower for girls, and age predicted smoking. Girls also showed lower incidence of alcohol consumption. Physical inactivity was more characteristic of girls as well of older adolescents and those with higher education. Girls experienced hunger less frequently than boys: 0.75 (0.60, 0.95). Adolescents 16 years and older reported hunger experiences significantly more frequently. This age group also reported both less consumption of nutritious foods (-0.195; -0.39, 0.00) and less consumption of non-nutritious foods (-0.37; 0.557,-0.116), than other age groups. When other demographic variables were taken into account, logistic regression showed no significant association between smoking behavior and education level.

Discussion

This study highlighted important health-related behaviors (smoking, alcohol drinking, nutrition and physical activity) among Sudanese adolescents. Findings showed that the overall prevalence of health-related behaviors among Sudanese adolescents vary according to gender, education level, and age.

Drinking alcohol was significantly more frequent among older male adolescents, and was seldomly reported by females. Smoking was also more prevalent among older male adolescents and those with higher education. Contrary to the tendency observed for smoking, uneducated adolescents drank more often than educated ones. Targeting smoking behavior is important, given that tobacco use alone accounts for nearly three million deaths each year and has been identified as the leading cause of preventable death in the developed world (Peto et al., 1992; Pan American Health Organization, 1992). It is recognized that smoking is associated with a wide range of diseases, including those that affect the respiratory and cardiovascular systems and multiple types of cancer (WHO, 1993).



Table 3: Odd ratios (OR) and unstandardized regression coefficient (b) with 95% confidence intervals (CI) for health-related behavior by demographic characteristics, simultaneously adjusted for other demographics.

Number of:						
	Smoking ^a (no, yes)	Alcohol ^a (no, yes)	Physical Inactivity ^a (no, yes)	Experience Hunger ^a (no, yes)	Healthy ^b Eating	Unhealthy ^b Eating
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	b (95% CI)	b (95% CI)
Gender¹						
Female	0.10*** (0.05, 0.22)	0.19* (0.05, 0.68)	15.24*** (10.86, 21.40)	0.75* (0.60, 0.95)	0.05 (-.079, 0.18)	-0.113 (-0.26, 0.03)
Age Group²						
13-15	3.35*** (1.08, 10.36)	1.20 (0.32, 4.55)	1.40 (0.98, 2.00)	1.26 (0.95, 1.68)	0.062 (-0.097, 0.22)	-0.123 (-0.303, 0.057)
16+	15.63 (5.11, 47.78)	2.61 (0.63, 10.71)	2.64*** (1.71, 4.08)	1.55* (1.09, 2.21)	-0.195* (-0.39, 0.00)	-0.337*** (-0.557, -0.116)
Education Level³						
Basic	1.8 (0.22, 14.84)	0.47 (0.06, 3.90)	0.4 (0.19, 1.04)	1.04 (0.51, 2.10)	-0.174 (-0.56, 0.22)	0.024 (-0.414, 0.462)
Secondary +	1.4 (0.18, 12.12)	0.27 (0.03, 2.64)	0.28*** (0.12, 0.69)	0.66 (0.32, 1.38)	0.024 (-0.43, 0.38)	0.158 (-0.298, 0.614)

^a OR based on logistic regression

^b Unstandardized regression coefficient based on linear regression

¹ Male reference group

² 10-12 reference group

³ No education reference group

*p<.05; **p<.01; ***p<.001

Alcohol consumption has increased in quantity and frequency (Plant et al., 1985) and the age at which drinking starts has declined globally. Heavy drinking can damage the liver and heart, harm an unborn child, increase the chances of developing breast and some others cancers, contribute to depression and violence, and interfere with relationships. This is true regardless of cultural norms regarding the use of alcohol. Distinctions that once separated cultures, gender and social classes are vanishing, as young people in developed and developing countries alike are increasingly using and abusing alcohol (Giesbrecht, & Fisher, 1987).

As far as nutrition and physical activity are concerned, a significant proportion of adolescents were prone to unhealthy habits and behavior. More than half of the female adolescents, almost half of the older age group, and almost half of those without education were physically inactive. Approximately half of the study population experienced hunger. Males responded with higher frequency on this item than females. Similar patterns emerged with regard to the older age group.

Both males and females were relatively high in consumption of non-nutritious foods such as tea, sweets, soft drinks and salty foods. Those in the age group 13 to 15 consumed more sweets and younger adolescents in the age group 10 to 12 drank tea more often. In contrast to other age groups, adolescents 16 years and older consumed significantly less nutritious as well as non-nutritious foods than other age groups. This would reflect the low availability of food in general. In contrast to the consumption of non-nutritious foods, where distinct differences between various subgroups were recorded, the consumption of nutritious foods was almost similar for all subgroups. The possibilities for obtaining a balanced diet are rare due to factors such as economics, culture, and overall lack of availability of healthy foods. Future interventions could include environmental approaches like increased availability, price reduction of fruits and vegetables in schools and easily accessible food supplementation programs. Therefore, national, local and school-based food programs could be an effective strategy for health promotion.

The effect of early lifestyle behaviors on overall health can become prominent in the future (during adulthood) when the negative impact of unhealthy behaviors endures long enough to affect health. Islam forbids addictive substances and intoxicants, that harm health; but it does not forbid tobacco (which was unknown in the Old World when the Koran was written). As there is no age



restriction on the purchase of cigarettes in Sudan, more intensive awareness campaigns are needed. Laws could also be enacted that prohibit the use and sale of tobacco to adolescents.

Similar to Sallis & Faucette (1992), the level of sports activity among adolescents in our study was relatively higher for boys than for girls. It is possible that girls would engage in sports activities more frequently if more resources were available to them. Overall, school health programs should be introduced in accordance with WHO standards.

It should be noted that our study primarily relied on reports of respondents. Self-reported data might be considered a source of bias, given the possibility of over or underreporting. However, various other studies have validated the use of self-report data (e.g. West & Sweeting, 1996). Additionally, this study was conducted in the Northern Sudan where most people are Muslim, thus, results cannot necessarily be generalized to the whole Sudanese population due to the differences in culture and religion between Southern and Northern Sudan.

Conclusions

Our research contributed to greater understanding of current health-related behaviors among Sudanese adolescents. A number of implications for interventions are pointed out by the findings, including: hunger experiences due to shortages of food in the household, less consumption of both nutritious and non-nutritious foods for older adolescents and physical inactivity of older adolescents and girls in particular. Islamic countries are now recipients of increasing messages from foreign cultures delivered through the global digital media. This has resulted in some tension because of the wide access to certain behaviors and lifestyles that are contrary to and forbidden by Islamic culture.

It is clear from the data presented, and from other research done around the world, that culturally specific, comprehensive health promotion interventions are needed.

Maximizing the health potential of adolescents requires a sustained and coordinated program of action, including: school health education, health promotion programs targeted at parents and community adolescent organizations, as well as initiatives at the national level.

References

AARONS, G.A., BROWN, S.A. & COE, M.T. (1999). Adolescents alcohol and drug abuse and health. *Journal of Adolescent Health*, 24, 412-421.

CRESANTA, J.L., BURKE, G.L., DOWNEY, A.M., FREEDMAN, D.S. & BERENSON, G.S. (1986). Prevention of atherosclerosis in childhood: Prevention in primary care. *Pediatric Clinics of North America*, 33, 835-858.

Transitions to Adulthood: A National Survey of Egyptian Adolescents. Cairo: Population Council.

GIESBRECHT, N. & FISHER, H. (Eds.) (1987). Alcohol-related Casualties (Proceedings of an International Symposium, Toronto, Canada, August 12-16, 1985). Toronto: ARF Books.



- GRUBER, J.J. (1986). Physical activity and self-esteem development in children: A meta-analysis. In Stull, A.G. & Eckert, H.M. (Eds.), *Effects of Physical Activity on Children*. Champaign, IL: Human Kinetics Books.
- HANSELL, S., WHITE, H.R. & VALI, F.M. (1999). Specific alcoholic beverage and physical and mental health among adolescents. *Journal of Studies on Alcohol and Drugs*, 60, 209-218.
- KENYON, G.S. & MCPHERSON, B.D. (1973). Becoming involved in physical activity and sport: A process of socialization. In Rarick G. (Ed.), *Physical Activity: Human Growth and Development*. New York: Academic Press.
- KING, A., WOLD, B., SMITH, C.T. & HAREL, Y. (1998). The Health of Youth: A Cross National Survey: Development Patterns of Behaviours and Attitudes. *WHO Regional Publications. European Series*, 69.
- LEON, A.S., CONNETT, J. & JACOBS, D.R. (1987). Leisure-time physical activity levels and risk of coronary heart disease and death: the multiple risk factor intervention trial. *Journal of the American Medical Association*, 258, 2388-2395.
- MILES, G. & EID, S. (1997). The dietary habits of young people. *Nursing Times*, 93, 46-48.
- PAN AMERICAN HEALTH ORGANIZATION (1992). Smoking and Health in the Americas: A 1992 report of the Surgeon General. Atlanta, GA, Public Health Service Office on Smoking and Health (DHHS publication, CDC 92, 8419).
- PETO, R., LOPEZ, A.D. & BOREHAM, J. (1992). Mortality from tobacco in developed countries: Indirect estimation from national vital statistics. *Lancet*, 339, 1268-1278.
- PLANT, M.A., PECK, D.F. & SAMUEL, E. (1985). *Alcohol, Drugs and School-Leavers*. London: Tavistock Publication.
- POWELL, K.E., THOMPSON, P.D. & CASPERSEN, C.J. (1987). Physical activity and the incidence of coronary heart disease. *Annual Review of Public Health*, 8, 253-287.
- SALLIS, J.F. & FAUCETTE, N. (1992). Physical Activity. In Wallace, H.M. et al., (Eds.), *Principles and Practices of Student Health*. Oakland, CA: Third Party Publishing.
- SOUTHGATE, D.A. (1993). Beverages, herbs and spices. In Garrow, J. & James, W.P. (Eds.), *Human Nutrition and Dietetics: Churchill Livingstone*, 327-328.
- TAYLOR, C.B., SALLIS, J.F. & NEEDLE, R. (1985). The relationship between Physical activity and exercise and mental health. *Public Health Reports* 100:195-202.
- WEST, P. & SWEETING, H. (1996). No job, no future: Young people and health in a context of unemployment. *Health and Social Care in the Community*, 4, 50-62.
- WORLD HEALTH ORGANIZATION (1993). Press Release. *World no-tobacco day: Health versus smoking*. Geneva: World Health Organization.



WORLD HEALTH ORGANIZATION (1995). *Adolescent Health and Development: The Key to the Future*. Geneva: World Health Organization. (WHO/ADH/94.3).

WORLD HEALTH ORGANIZATION (1997). *Coming of Age: From Facts to Action for Adolescents Sexual and Reproductive Health* (WHO/FRH/ADH/97.18).
