Health habits and behaviour of adolescent schoolchildren, Taif, Saudi Arabia

A.H. Abou-Zeid,[1] T.M. Hifnawy[2] and M. Abdel Fattah[3]

العادات والسلوكيات المحفوفة بالمخاطر لدى أطفال المدارس المراهقين في الطائف، المملكة العربية السعودية

علاء أبو زيد، تامر حفناوي، معتز عبد الفتاح

الخلاصة: هدفت الدراسة إلى تقديم معلومات حول العادات والسلوكيات والمشكلات والاحتياجات المتعلقة بصحة المراهقين والأطفال الذين يعيشون في مجتمع عسكري في الهدا والطائف، المملكة العربية السعودية، وهي معلومات يمكن أن تقدم توجيهات لبرامج الصحة المدرسية. شملت هذه الدراسة العَرْضية 284 طالباً في المدارس الابتدائية والإعدادية. وقد كان معدل انتشار التدخين 21.3 بين الذكور، و4.9٪ بين الإناث. أما معدل البدانة فقد كان 20.8٪، وأبلغ 68.8٪ من الطلاب أنهم يقودون السيارات بدون رخصة وأن 82.3٪ منهم لايربطون أحزمة الأمان. وقد سجل الباحثون معدلات إجمالية مرتفعة للنشاط البدني بلغت 75٪.

ABSTRACT The aim of this study was to provide data regarding habits, behavior, problems and needs regarding health in adolescent children from a military community at Al Hada and Taif, Saudi Arabia which could guide school health programmes. We carried out a cross-sectional study on 284 preparatory and secondary school students. Prevalence of smoking was 21.3% among males and 4.9% among females. The rate of overweight was 20.8%. Driving without a license was reported by 68.8% of students, and 82.3%said they didn't fasten seat belts. However, we recorded a high rate of physical activity, 75.0% overall.

Habitudes et comportements sanitaires des adolescents scolarisés à Taëf (Arabie saoudite)
RÉSUMÉ Cette étude avait pour objectif de fournir des données sur les habitudes, le comportement, les problèmes et les besoins en matière de santé des adolescents d'une communauté militaire d'Al Hada et de Taëf (Arabie saoudite), afin d'orienter des programmes de santé scolaire. Nous avons réalisé une étude transversale sur 284 élèves des cycles préparatoire et secondaire. La prévalence du tabagisme s'élevait à 21,3 % chez les garçons et à 4,9 % chez les filles. Le taux de surpoids était de 20,8 %. La conduite sans permis concernait 68,8 % des élèves et 82,3 % ont déclaré ne pas attacher leur ceinture de sécurité. En revanche, nous avons constaté un taux global d'activité physique de 75,0 %, ce qui représente un chiffre élevé.

[1]Department of Public Health, Faculty of Medicine, Cairo University, Cairo, Egypt (Correspondence to A.H. Abou-Zeid: alaabouzeid@yahoo.com).
[2]Department of Public Health, Faculty of Medicine, Beni Suef University, Beni Suef, Egypt.
[3]Department of Preventive Medicine, Al Hada Armed Forces Hospital, Taif, Saudi Arabia.
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Introduction

The Saudi Arabian population is characterized by rapid growth and a large cohort of youth [*1*]. This rapid growth along with the lack of information about Saudi Arabian adolescents prompted the study of the health profile of adolescents in Saudi Arabia with the aim of gaining a better understanding of the youth in Saudi Arabia today.

Smoking is a major worldwide public health problem. It is now by far the largest preventable cause of death in the industrialized world [*2*]. Although there is a health warning on every packet of cigarettes indicating that smoking is the main cause of lung cancer, lung diseases and heart and artery diseases, and despite the fact that antismoking clinics are distributed all over the country, smoking is increasing rapidly in Saudi Arabia among the young, partly due to the aggressive marketing methods of tobacco companies [*3*].

The aim of this study was to determine the habits, behaviour, problems and needs with regard to health of adolescent schoolchildren in order to provide data which could guide school health programmes in the Taif region specifically, and in Saudi Arabia in general.

Methods

The study was conducted at Al-Hada and Taif areas. Al-Hada is located in the Taif Mountains (Western region of Saudi Arabia) at an altitude of 1800 m.

Study design

We carried out a cross-sectional descriptive study to assess the health habits and health problems of adolescent students through structured interviews with the students and semi-structured interviews with schoolteachers. Quantitative and qualitative approaches were used to enable reliable and comprehensive data collection. Data collection was conducted over 3 months starting February 2005.

We selected our sample from students enrolled in the schools of Al-Hada and Taif Armed Forces Hospitals Programme, Taif, Saudi Arabia. This programme is served by 7 preparatory schools, 4 for boys (with 716 students) and 3 for girls (with 498 students) and 4 secondary schools, 2 for boys (with 414 students) and 2 for girls (with 510 students). The expected age for preparatory school students is 12–16 years and for secondary school students 16–19 years. Accordingly, the age of the study population was 12–19 years.

Of the 11 schools serving Al-Hada and Taif Armed Forces Community, 6 were selected using a simple random sampling technique: 1 preparatory school and 2 secondary schools for boys and similar number for girls.

From each school, a systematic random sample of students were interviewed considering equal male to female ratio and the total student population weight with a ratio of 1:2 for preparatory:secondary schools. More students were interviewed from secondary schools because secondary school students were expected to understand the objectives of the study better and give more reliable data.

Headmasters/teachers (7–10 from each school), selected by simple random sampling, were also interviewed. The student population selected for this study represented > 13% of the total preparatory and secondary student population enrolled in Al-Hada Armed Forces Hospitals Programme (284/2138 students); 141 were males and 143 were females, 101 (35.6%) from preparatory stage and 183 (64.4%) from secondary schools. For each school, the sample was divided equally between

the 3 grades. From within each grade, equal numbers of students from each class were randomly chosen using a systematic random technique.

A pre-tested, structured questionnaire was used covering the students' health habits and health status. The student questionnaire comprised around 100 questions including personal and demographic data, faulty health habits, psychological and sexual health, accidents and injuries, chronic illnesses and utilization of and satisfaction with health care services delivered through the military medical facilities.

The teachers' questionnaire comprised 20 questions on personal data and their opinion about common illnesses and faulty habits which may be the cause of health-related problems affecting their community and asking them to prioritize these topics from their point of view. We also asked about their utilization of and satisfaction regarding health care services delivered by the military medical facilities.

Body mass index (BMI) and the corresponding BMI-for-age percentile were estimated using the CDC child and teen calculator [*4*]. This can be used for children and teenagers up to 19 years old.

Smokers were defined as anyone who had smoked all or part of a cigarette during the past 30 days or reported that he/she was still smoking.

Health problems mentioned by the students were revised by reviewing their medical records for confirmation.

Statistical analysis

The data from the in-depth interviews were analysed using a qualitative approach. The data were extracted into a common pool and a descriptive analysis was done according to prevalence. Prioritization of health problems was done. For the quantitative data from the students' interviews, the data were entered into *Excel* and the frequency of replies was calculated. *SPSS*, version 11, was used for the statistical analysis in this study.

Ethical considerations

Administrative approval was obtained from the General Director of Education in Taif District. Ethical approval was obtained from the ethics committee at Al-Hada Hospital. Informed consent was obtained from parents and an assent was obtained in writing from each participating student. Access to collected data was restricted to the principal investigator only.

Results

Father's level of education was mainly up to secondary schooling (93.0%). Most of the fathers were soldiers (61.6%), some were officers (27.2%) and 11.2% were civilians working as clerks and technicians. Salary was the only source of income for 90.9% of the participants. Mean family size was 4.7 [standard deviation (SD 3.1; range 2–13] persons and crowding index was ≤ 2 in 94.4% of cases.

Body measurements indicated that 16.9% of students were of abnormal weight for age, being either underweight or overweight. Stunted growth affected 10.2% of students. Abnormal BMI for age was found in 38.4% of students, mainly related to overweight (20.8%).

Female students were more frequently underweight (14.0%) and stunted (12.6%) than male students (9.9% and 7.8% respectively) although the difference was not statistically significant. Male students were more likely to be obese based on weight-for-age and BMI-for-age. Again, this difference was not statistically significant (Table 1).

Table 1 **Demographic characteristics and body measurements of adolescent students in Taif**

Variable	Males (*n* = 141)		Females (*n* = 143)		Total (*n* = 284)		*P*-value
	No.	%	No.	%	No.	%	
Education stage							
Preparatory	48	34.0	47	32.9	95	33.5	0.9
Secondary	93	66.0	96	67.1	189	66.5	
Father's education							
Primary/preparatory	48	34.0	40	28.0	88	31.0	0.52
Diploma/secondary	83	58.9	93	65.0	176	62.0	
University	10	7.1	10	7.0	20	7.0	
Crowding index							
≤ 2	128	90.8	140	97.9	268	94.4	0.13
> 2	13	9.2	3	2.1	16	5.7	
Weight-for-age z-score							
Normal	117	83.0	119	83.2	236	83.1	0.16
Underweight	14	9.9	20	14.0	34	12.0	
Overweight	10	7.1	4	2.8	14	4.9	
Height-for-age z-score							
Normal	130	92.2	125	87.4	225	89.8	0.24
Stunted	11	7.8	18	12.6	29	10.2	
BMI for age z-score							
Underweight	15	10.6	13	9.1	28	9.9	0.48
Normal	82	58.2	93	65.0	175	61.6	
Overweight	30	21.3	29	20.3	59	20.8	
Obese	14	9.9	8	5.6	22	7.7	
Mean (SD) age (years)	16.4 (1.9)		16.2 (1.9)		16.3 (1.9)		0.36
Mean (SD) family size	4.4 (3.6)		4.9 (3.0)		4.7 (3.1)		0.24

Table 2 illustrates smoking pattern of male and female students. The overall rate of current smoking was (13.0%). The proportion of students who never smoked was 70.4%. The proportion of current male smokers (21.3%) was over 4 times that of female smokers (4.9%) ($P < 0.01$). Most of the smokers smoked cigarettes (65.5%) and 11.9% smoked *shisha* (water pipe). One out of each 2 students (51.8%) had at least 1 smoker at home. A smaller proportion of females (7.0%) perceived smoking as beneficial compared to males (12.2%). As expected for adolescents, peer persuasion was the most important factor that pushed these adolescents to smoke. The percentage of females who had tried smoking (ex-smoker) was unexpectedly high (13.3%).

There was a significant difference in illicit drug use comparing female to male students ($P < 0.025$) (Table 2). More females were using illicit drugs (7.6%) than males (1.4%). Similarly, female students reported more illicit drug users at home (5.1%) compared to male students (0.7%).

Male students ate more meals (mean 3.39, SD 1. 9) compared to female students (mean 2.89, SD 1.0) which was statistically significant ($P < 0.01$) (Table 3). Conversely, female students were more inclined to eat breakfast (64.1%) than male students (32.4%) ($P < 0.01$).

Table 2 **Smoking habits and substance abuse among adolescent students in Taif**

Variable	Males (*n* = 141)		Females (*n* = 143)		Total (*n* = 284)		*P*-value
	No.	%	No.	%	No.	%	
Smoking status							
Current smoker	30	21.3	7	4.9	37	13.0	< 0.01
Ex-smoker	28	19.9	19	13.3	47	16.5	
Non-smoker	83	58.9	117	81.3	200	70.4	
Type of smoking (current & ex-smokers)							
Cigarettes	38	65.5	17	65.4	55/84	65.5	0.75
Shisha	6	10.3	4	15.4	10/84	11.9	
Both	14	24.1	5	19.2	19/84	22.6	
Attempted to stop smoking (current smokers)	14/30	46.7	6/7	85.7	21/37	56.8	0.104
Presence of any other smoker at home	70	49.6	78	54.5	148	51.8	0.41
Having peers who smoke	74	52.5	11	7.7	85	29.9	< 0.01
Factors that motivate student to smoke (current & ex-smokers)[a]							
Peer persuasion	55/58	94.8	25/26	96.2	70/84	83.3	0.23
Family member imitation	13/58	22.4	12/26	46.2	36/84	42.8	
Curiosity	33/58	56.9	19/26	73.1	15/84	17.9	
Student's perception of health effects of smoking							
Good	5/58	12.2	3/26	7.0	8/84	9.5	0.48
Hazard	36/58	87.8	23/26	93.0	76/84	90.5	
Illicit drug use	2/139	1.4	9/118	7.6	11/257	4.3	0.025
Illicit drug use by other home members	1/140	0.7	6/117	5.1	7/257	2.7	0.049
Age at first smoking, mean (SD) (years)	13.9 (2.0)		13.3 (3.4)		13.7 (3.2)		0.51
No. cigarettes/day (current smokers), mean (SD)	9.2 (4.1)		5.6 (2.7)		7.4 (3.9)		< 0.01
No. shisha smoked/day (current smokers), mean (SD)	1.5 (0.7)		0.6 (0.3)		1.1 (0.7)		0.03

[a]*Responses are not mutually exclusive, so total may be more than 100%.*

Male students practised sports and brushed their teeth more than female students ($P < 0.01$ for both) (Table 3).

Risk factors for traffic injuries scored very high (Table 3). Surprisingly, some female students declared that they drove (4.9%). A high proportion of male students stated they drove without a license (68.8%). Most of the male and female students did not use the seat belt while in a moving vehicle (88.0%). One out of 4 students (25.7%) recalled experiencing ≥ 1 injuries.

The mental health of both male and female students is presented in Table 3. Notably, 3 in 4 female-students (79.6%) fought frequently at home; the rate for males was 47.5% ($P < 0.01$).

The most prevalent chronic disease among students was dental caries, which affected nearly half the participants (49.8%) (Table 4). Different forms of allergic conditions affected a high proportion of students: allergic dermatitis and bronchial asthma affected 22.5% and 7.0% of schoolchildren

Table 3 **Health habits, safety behaviours and psychological status of adolescent students in Taif**

Variable	Males (*n* = 141)		Females (*n* = 143)		Total (*n* = 284)		*P*-value
	No.	%	No.	%	No.	%	
Does not fastening seat belt in a car	116	82.3	134	93.7	250	88.0	0.03
Prefers team activities	118	83.7	113	79.0	231	81.3	0.54
Drinking tea after meals	113	79.6	113	79.6	226	79.6	1.00
Has lots of friends	106	74.1	103	73.0	209	73.6	0.52
Practises sports at least once/week	119	83.8	82	57.8	201	70.8	< 0.01
Fights frequently at home	67	47.5	113	79.6	180	63.6	< 0.01
Eats breakfast regularly	46	32.4	91	64.1	137	48.2	< 0.01
Fights frequently at school	72	51.1	62	43.7	134	47.3	0.24
Prefers going out with friends rather than family	70	49.3	50	35.2	120	42.3	0.022
Brushes teeth regularly	77	54.2	37	26.1	114	40.1	< 0.01
Drives without a license	97	68.8	7	4.9	104	36.6	< 0.01
History of any type of injury	41	29.1	32	22.4	73	25.7	0.22
Washed hands before meals	37	26.1	32	22.5	69	24.3	0.58
Has routine medical examination	25	17.6	27	19.0	52	18.3	0.35
Ever seen by a psychiatrist	6	4.3	1	0.7	7	2.5	0.12
Mean no. of meals/day (SD)	3.39 (1.9)		2.89 (1.0)		3.1 (0.9)		< 0.01
Mean no. fast-food meals/week (SD)	2.56 (2.4)		2.44 (2.1)		2.5 (2.2)		0.619

SD = standard deviation.

respectively. Food allergies were estimated to affect 22.2% of the students and were statistically significantly more common among female students ($P < 0.01$). Anaemia was more prevalent among female students (16.1%) compared to male students (7.1%) ($P = 0.025$).

With regard to common health problems and their underlying etiologies, the students and their teachers agreed that bronchial asthma was the most important disease, and appears to be a prominent problem in school (Table 5). Acute respiratory infection was ranked second while 54.3% of teachers and 20.9% of students saw diabetes as an important disease. None of those interviewed mentioned dental caries although it was prevalent among students (Table 4). Eye problems and obesity were mentioned as health problems by students only (27.2% and 13.8% respectively) (Table 5).

There was a consensus that smoking constitutes the most important risky health habit as it scored the highest among both students (51.9%) and teachers (56.5%). Bad personal hygiene was important in both groups (23.7% of students and 41.3% of teachers). Students but not teachers indicated illicit drug use (21.6%), bad hand hygiene (20.5%) and using communal objects (37.5%) as bad health habits prevailing among the students. Teachers (58.7%) but not students expressed their concerns about excessive soft drinks and fast food intake by the students (Table 5).

Discussion

The prevalence of smoking among males in our study (21.3%) is comparable to what has been reported in other Saudi Arabian studies (20%–29%) [*5,6*], in the United

Table 4 **Chronic diseases affecting adolescent students in Taif, by sex**

Disease/condition	Males (*n* = 141)		Females (*n* = 143)		Total (*n* = 284)		*P*-value
	No.	%	No.	%	No.	%	
Dental caries/problems	68	49.3	72	50.3	140	49.8	0.91
Allergic dermatitis	26	18.4	38	26.6	64	22.5	0.11
Food allergies	19	13.5	44	30.8	63	22.2	0.01
Impaired vision	30	21.4	32	22.4	62	21.8	0.88
Nutritional anaemia	10	7.1	23	16.1	33	11.6	0.025
Bronchial asthma	12	8.5	8	5.6	20	7.0	0.24
Impaired hearing	4	2.8	12	8.4	16	5.6	0.07
Drug sensitivity	5	3.5	10	7.0	15	5.3	0.29
Kidney diseases	2	1.4	7	4.9	9	3.2	0.17
Psoriasis	2	1.4	4	2.8	6	2.1	0.68
Bleeding tendency	2	1.4	3	2.1	5	1.8	1.0
Epilepsy	3	2.1	0	0.0	3	1.1	0.12
Thalassaemia	3	2.1	0	0.0	3	1.1	0.12
Benign tumours	1	0.7	2	1.4	3	1.1	0.62
Diabetes mellitus	0	0.0	2	1.4	2	0.7	0.49
Tuberculosis	1	0.7	1	0.7	2	0.7	1.0
Heart diseases	0	0.0	1	0.7	1	0.4	1.0
Non-infectious liver disease	0	0.0	0	0.0	0	0.0	–
Viral hepatitis	0	0.0	0	0.0	0	0.0	–
Malignancies	0	0.0	0	0.0	0	0.0	–

Arab Emirates (19%) [*7*] and in Yemen (19.6%) [*8*]. It is much higher than has been reported in Oman (4.5%) [*9*]. Smoking was significantly more frequent among boys, which is consistent with what was found in other Saudi Arabian studies [*5,6*], Yemen [*8*] and Tunisia [*10*].

Hartos Eitel and Simons-Morton also found that risky driving was reported in 80% of the teenagers in their sample [*11*]. In our study 68.8% reported driving without a license and 82.3% reported not fastening their seat belt in a car. Increasing parents' power to impose and enforce driving restrictions on previously licensed teenaged drivers has been recommended [*11*].

Non-fatal, fight-related injuries among young people result in lost capacity and high costs for medical care and rehabilitation [*12*]. Witnessing violence is a significant predictor of getting involved in fights [*12*]. In our study, female students more frequently reported fighting at home (79.6%) than at school and compared to their peer males. Studies in the United States of America showed that 39%–53% of studied adolescents had been in physical fights [*13*]. Loeber et al. found that the prevalence of a psychiatric diagnosis after 7 years follow-up was 3 times higher for persistent fighters than for non-fighters [*14*].

In some European countries such as the Scandinavian countries the prevalence of childhood obesity is lower than in Mediterranean countries; nonetheless, the proportion of obese children is rising in both regions [*15*]. The highest prevalence rates have been observed in developed coun-

Table 5 **Health problems and risky habits prevailing in the community from the perspective of adolescent students and teachers**

Variable	Students (*n* = 283)		Teachers (*n* = 46)	
	No.	%	No.	%
Most important illnesses prevalent in the study community				
Bronchial asthma	147	51.9	29	63.0
Acute respiratory infection	112	39.5	22	47.8
Eye problems	77	27.2	0	0.0
Diabetes	59	20.9	25	54.3
Obesity	39	13.8	0	0.0
Hypertension	0	0.0	0	0.0
Dental caries	0	0.0	0	0.0
Gastrointestinal tract problems	0	0.0	0	0.0
Heart disease	0	0.0	0	0.0
Most important risky habits prevalent in the study community				
Smoking	147	51.9	26	56.5
Using objects in common	106	37.5	0	0.0
Poor personal hygiene	67	23.7	19	41.3
Illicit drug use	61	21.6	0	0.0
Poor hand hygiene	58	20.5	0	0.0
Excessive consumption of soft drinks/fast food	0	0.0	27	58.7
Improper garbage management	0	0.0	0	0.0
Sedentary lifestyle	0	0.0	0	0.0

Responses are not mutually exclusive so the total may be more than 100%.

tries, however, prevalence is increasing in developing countries as well. It is high in the Middle East and Central and Eastern Europe [*16*]. In a Saudi Arabian study, 1 in every 6 boys aged 6–18 years was obese [*17*]. In the current study, the rate of overweight was 20.8%.

In both developed and developing countries there are proportionately more girls overweight than boys, particularly among adolescents [*18–20*]. However we found that male students were more likely than girls to be obese based on weight- and BMI-for-age measurements. Overweight and obesity in childhood have significant impact on both physical and psychological health. Psychological disorders such as depression occur with increased frequency in obese children [*21*]. Overweight children followed up for 40 [*22*] and 55 years [*23*] were more likely to have cardiovascular and digestive diseases, and to die from any cause compared with those who were lean.

Bronchial asthma was estimated to affect 7.0% of the students in our study. The prevalence of bronchial asthma in the Eastern Jeddah Region was estimated in 2003 at 9.6% [*24*] but a national health survey conducted in Saudi Arabia also in 2003 estimated a lower prevalence, 4.1% [*25*]. Our estimate lies between these 2, which could be a more realistic figure.

We recorded a very high rate of physical activity among the study population (75.0%) compared to an estimated 43.2% in a study in Jeddah [*24*]. The rate of physi-

cal inactivity was estimated among males in Riyadh at 56.8% which is far lower than our estimate [*26*]. The reason for the disagreement is most likely that our sample comprised children of military personnel, who are subjected to physical practices as part of military training and requirements.

In a multi-centre study of high-school students in Saudi Arabia, the rate of regular tooth brushing (89.0% of males and 96.0% of females) [*27*] was much greater than the rate we estimated (40.1%) in our study.

The main weakness of this study was the fact that the study population was a unique group (sons and daughters of military people) which may not be representative of the general population in Saudi Arabia. Nonetheless, the military population is not a limited group in relation to the total population in Saudi Arabia. Besides, this may be the first community study to be conducted to explore the health status and health needs of a military community in Saudi Arabia.

Another weakness of this study was that, due to limitation of resources (time and money) we did not subject the participants to any kind of medical testing to confirm the presence of disease. Therefore, undiagnosed cases of illness were not estimated.

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