

Health and behaviours of Tunisian school youth in an era of rapid epidemiological transition

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الصحة والسلوكيات لدى الشباب في مدارس تونس في حقبة التحول الوبائي السريع
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الخلاصة: أجري الباحثون مسحاً مستعرضاً شمل عينة ممثلة تتألف من 699 من تلاميذ المدارس الثانوية، وكان الهدف من ذلك المسح تقييم سلوكيات الشباب في مدارس تونس وما يتعلق بها من جودة الحياة في الوسط الحضري التونسي. واتضح أن معدل فرط الوزن 20.7٪ وأن مستوى النشاط البدني لدى معظم الشبان غير كاف، وأنهم لم يألفوا القيام بأنشطة بدنية معتدلة بالتكرار الموصى به. وكانت الأحرار المستندة على المعايير والخاصة بالحالة النفسية قريبة من المعدل الوسطي، وكانت أفضل بقليل لدى الصبيان مما هي عليه لدى الصبايا. وترى الصبايا أنهن يزرحن تحت شدة ضغط نفسي تزيد عما لدى الصبيان. ومن بين جميع التلاميذ، أفصح 35٪ منهم أنهم يدخنون السجائر وأن 14٪ تعاطوا الكحول مرة واحدة على الأقل أثناء حياتهم. وقد كان المصدر الرئيسي للتثقيف الصحي هو الإعلام (59٪) والعاملين الطبيين (36٪).

ABSTRACT To assess youth health behaviours and related quality of life in urban Tunisia, we conducted a cross-sectional survey of a representative sample of 699 secondary-school students. The overweight rate was 20.7%. Most of the sample had an insufficient level of physical activity and were unfamiliar with the recommended frequency of moderate physical activity. Norm-based scores of psychological state were about average, slightly better for boys than girls. Girls perceived themselves to be more stressed than boys. Of all students, 35% declared having smoked a cigarette and 14% having drunk alcohol at least once in their lives. The main sources of health education were mass media (59%) and medical staff (36%).

Santé et comportements des élèves tunisiens dans une période de transition épidémiologique rapide

RÉSUMÉ Afin d'évaluer les comportements des jeunes en matière de santé et la qualité de vie associée dans la Tunisie urbaine, nous avons réalisé une étude transversale à partir d'un échantillon représentatif de 699 élèves de l'enseignement secondaire. Le taux de surpoids était de 20,7 %. La plupart des jeunes avaient un taux d'activité physique insuffisant et ne savaient pas quelle était la fréquence recommandée d'une activité physique modérée. Les scores normalisés relatifs à l'état psychologique étaient proches de la moyenne et légèrement meilleurs pour les garçons que pour les filles. Les filles s'estimaient plus stressées que les garçons. Sur la totalité des élèves, 35 % ont déclaré avoir fumé une cigarette et 14 % avoir bu de l'alcool au moins une fois dans leur vie. Les principales sources d'éducation sanitaire étaient les médias (59 %) et le personnel médical (36 %).

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Introduction

For many years, young people were considered a healthy group with no serious health problems compared to younger children. Nowadays, this population is exposed to many health risks mainly related to their lifestyles, but they do not yet have access to the protection associated with adulthood [1]. In industrialized countries, low levels of physical activity and unhealthy dietary practices contribute to significant and immediate health risks such as childhood overweight and obesity and type 2 diabetes mellitus, as well as long-term health consequences such as cardiovascular disease, some cancers, overweight and obesity in adulthood, and adult-onset diabetes mellitus [2,3]. Behaviours and environmental factors also have an impact on health-related quality of life of youth [4,5].

Adolescent and youth health has progressively become a high priority concern in many industrialized countries [6–8], as it is acknowledged that an important share of adolescent morbidity can be attributed to preventable risk factors, e.g. sedentary lifestyles, poor eating behaviours, tobacco or substance use.

In developing countries in rapid epidemiological transition such as Tunisia, child and adolescent health is also becoming a real concern for decision-makers, and its assessment is viewed as a public health priority [9,10]. The globalization and westernization of lifestyles are probably the most important determinants of changes in health status in Tunisia nowadays [11,12], especially among urban adolescents.

The assessment and understanding of health behaviours is the first step in the design and implementation of services and preventive programmes. The aim of the current paper was to contribute to this assessment in the present Tunisian context.

Methods

Study design and participants

This was a cross-sectional questionnaire survey covering a representative sample of the third-level secondary-school classes in the Ariana area, a large neighbourhood of Tunis, covering a wide range of socioeconomic conditions. We used a 2-stage stratified random sampling frame. In the first stage, schools were stratified by district ($n = 4$) and 2 schools were selected from each district (except for 1 district where only 1 school was selected). In the second stage, we selected 4 third-level classes in each school, which yielded a total of 28 classes with a total of 753 students in the sample. The total population size of the third-level classes from which the sample was selected was 3539.

Owing to practical difficulties (school schedules, average length of time needed to administer the questionnaires, and the limits of self administration), the questionnaires were administrated separately to sub-samples of the students to optimize the rate of return, as indicated in pre-testing. The sample was divided into the following 3 sub-samples with all classes selected and allotted randomly:

- sub-sample A: 1 class per school answered the food behaviour questionnaire combined with the SF-36 scale, 61 males 102 females;
- sub-sample B: 1 class per school answered the health and lifestyle questionnaire, 53 males 123 females;
- sub-sample C: 2 classes per school answered the physical activity questionnaire, 140 males, 220 females.

For sub-sample C, our hypothesis was that the frequency of practising sport is low. Therefore to improve precision by reducing the dispersion of replies, we selected 2

classes rather than 1 as for the other sub-samples.

Physicians and nurses who are responsible for school health care were involved in asking classes of students to complete the questionnaire during a teaching session followed by anthropometric measurements (height and weight).

The study was approved by the health authorities in charge of the District of Ariana and by the school system authorities. Participation in the survey was voluntary and the participants were informed of the strict confidentiality of their answers.

Instruments

We used 4 questionnaires for data collection which were based on available questionnaires for self-reporting by adolescents. They were translated from the original French version into Tunisian Arabic dialect (with a back translation check). They were then pre-tested on different schoolchildren and adolescents before the beginning of the survey to ensure full understanding and feasibility.

Eating

Questions concerning knowledge, attitudes and behaviours were selected from standard published questionnaires [13, 14] and adapted and tested for their pertinence to youth in Tunisia. We calculated the 3 following knowledge scores:

- definition of a healthy diet score, composed of 8 dichotomous questions (diet contains many fruits, many vegetables, little salt, a lot of red meat, a lot of fish, lack of fruit and vegetables, lack of red meat, rich in fat);
- definition of a well-balanced diet score, composed of 6 dichotomous questions (diversified nutrition: eat every food, eat reasonable quantities, eat 3 regular meals, avoid snacking between meals,

avoid certain foods, e.g. fat, salt, favour certain foods, e.g. vegetables, fruit, dairy food);

- a nutrition risk factor score, composed of 3 dichotomous questions (nutrition plays: an important/moderate *versus* little/absent/don't know role in cardiovascular diseases, obesity and diabetes). A score of 100 or 0 was attributed for each type of disease and the final score was the mean of the 3 scores.

Health-related quality of life

This was measured using the generic standardized SF-36 patient-assessed health survey [version 2 questionnaire, Quality Metric Inc., Lincoln, Rhode Island, United States of America (USA)] which is made up of 36 items assessing the following 8 health-related quality of life dimensions or scales: physical functioning; role-physical; bodily pain; general health; vitality; social functioning; role-emotional; and mental health. Scores were calculated using the SF health outcome scoring software, version 1.0. All scale scores range from 0 to 100, with 100 representing optimal physical functioning and well-being.

Physical functioning, role-physical, bodily pain and general health are condensed in a physical component summary of health (PCS); social functioning, role-emotional, mental health and vitality contributed to the elaboration of the mental component summary (MCS) [15]. These 2 summary components have been extracted from the 8 original scales in order to reduce the number of outcome measures. Together, they account for 80%–85% of the variance in the 8 scales. These scores are standardized through norm-based scoring to a normal distribution with a mean of 50 and a standard deviation (SD) of 10 [16]. We used the general population in the USA for norm-based scores as it was the only set of

data available for the software; it has been suggested that in international trials the original USA algorithms could be adopted as a reference [17].

Physical activity

This was assessed quantitatively using a frequency questionnaire that had previously been validated for Tunisian adults [18] concerning physical activity during the month preceding the survey, and adapted for youth by adding more-detailed questions about sport and leisure activities [19].

Health and lifestyle

This included youth health, health care consumption, knowledge about health in Tunisia and around the world, tobacco and alcohol consumption, attitudes about tobacco, drug and alcohol consumption, and perceived stress. Results for tobacco and alcohol consumption and perceived stress only are shown in this paper. Perceived stress used a validated stress scale composed of 4 questions enabling calculation of a Perceived Stress Scale Score [20]. Each question had 5 answers coded 0–100, or the reverse, depending on the sense of the question. Scores increased with a decrease in the level of perceived stress.

Weight was measured by trained health personnel using digital scales previously checked for accuracy (precision 100 g) and height was measured using standard wooden height gauges (precision 1 mm) with the participant in a standing position without shoes. Body mass index (BMI) was calculated as body weight/height² (kg/m²). The international BMI cut-off points for children and adolescents developed by the Childhood Obesity Working Group of the International Obesity Task Force (IOTF) were used to define normal weight, overweight or obese according to age and sex [21].

Young people with BMI values that corresponded to an adult BMI of ≤ 24.9 kg/m² were classified as normal weight, those with BMI values that corresponded to an adult BMI of 25.0–29.9 kg/m² were classified as overweight (pre-obese), and those with BMI values that corresponded to an adult BMI of ≥ 30.0 kg/m² were classified as obese.

Statistical analysis

We used *SPSS*, version 10.0 for data entry and validation and for statistical analyses. Values are expressed as mean and standard deviation (SD) for continuous variables and percentages for categorical variables. Type 1 error risk was set at 0.05 for all analyses. We used the Student *t*-test and analysis of variance for comparisons of means and chi-squared for comparisons of percentages. Comparisons mainly concerned differences between males and females.

Results

Sample characteristics

Originally 753 subjects attending secondary schools were recruited into the study, but 20 were excluded because they were absent the day of the survey or returned an empty questionnaire; of the remaining 733, 34 did not enter their sex or birth date or refused to be weighed. The final sample therefore included 699 students (92.8%) aged 15–23 years among those attending 3rd grade of secondary school from February to April 2005 in the classes surveyed. Altogether, the sample included 254 males and 445 females; female:male ratio was 1.75.

The mean age of the participants in the total sample was 18.4 (SD 1.1) years. There were no major differences between sub-samples with respect to socioeconomic characteristics; significant differences between sexes concerning sociodemographic

factors were observed only in sub-sample B where the parents' level of education was significantly higher for boys ($P < 0.01$ for fathers' education and $P < 0.05$ for mothers') and mothers' occupation category was also significantly higher for boys ($P < 0.05$), and in sub-sample C where boys were slightly older than girls [18.7 (SD 1.3) years versus 18.3 (SD 1.2) years, $P < 0.01$].

Overweight and obesity

The prevalence of overweight (including obesity) was 20.7%, and varied from 17.6% to 22.8% depending on the sub-sample. The prevalence of obesity was 4.7% in the total sample and varied from 2.5% to 5.8% depending on the sub-sample. The prevalence of obesity was significantly higher for males (7.1%) than for females (3.4%) ($P < 0.05$). The prevalence of overweight was not significantly related to socioeconomic status.

Food and nutrition

The mean scores for knowledge defining a healthy diet and a well-balanced diet were generally ≥ 70 (on a scale of 0 to 100) (Table 1). Two-thirds of the respondents considered that attention should be paid to what one eats from early childhood onwards, based on the parents' role. The nutritional risk factor score (cardiovascular diseases, diabetes, obesity) was also high, > 70 . The knowledge level score was generally higher for girls than boys, although a statistically significant difference was only found for knowledge of a well-balanced diet ($P < 0.05$).

However there was a difference in the perception of the quality of the participants' own usual diet: the proportion of boys who considered they had a well-balanced diet was higher than that of girls; the majority of girls (60.4%) did not consider they had a well-balanced diet. The influence of health

education was slightly greater for girls than boys but this was not statistically significant; between 20% and 25% were unable to estimate the degree of influence of health education. Almost 40% preferred street food, the proportion being higher among girls (43.6%) than boys (30.5%).

Most of the respondents (75.9%) said they watched television during meals with no significant difference between boys and girls (Table 1). Less than 10% reported sometimes skipping lunch. Girls reported skipping meals more frequently than boys, particularly breakfast (49.0% versus 25.4%, $P < 0.01$). About 50% reported snacking in the morning (45.6%) 2 to 7 days a week, or in the afternoon (59.4%). Snacking after dinner was mentioned by a smaller proportion (41.5%), almost twice as frequently by boys than girls (56.9% versus 32.7%, $P < 0.01$).

Physical activity

Only 13.9% considered that physical activity was necessary every day (Table 2). Slightly less than one-third said they practised a regular physical activity (based on their own perception), significantly more boys than girls (38.9% versus 24.8%, $P < 0.01$). In addition, the intensity of physical activity really undertaken was judged to be moderate by the majority (70.0%): high intensity was more frequently stated by boys (24.3%) than girls (9.3%). A very large majority considered practising daily moderate physical activity would be effective (93.0%) and pleasant (84.8%); only 28.5%, however, considered it easy to do, although more than 50% planned to do 30 min of moderate physical activity daily in the coming year.

Less than half of the subjects had physical education at school during the week preceding the survey (Table 3); the proportion was higher among girls than boys, but

no significant difference was observed. A minority, 6.4% of boys and 15.9% of girls, said they did not like practising sport ($P < 0.05$), and 28.6% of girls and 13.6% of boys said they preferred watching others practising sport to practising themselves

($P < 0.01$). Around a quarter of the subjects said that sport was not a tradition in their neighbourhood, although the majority said they were encouraged to practise sport by their mothers (79.7%) and fathers (67.4%).

Table 1 Dietary knowledge, perception and behaviour in adolescents according to sex

Knowledge, perception or behaviour variable	Males (n = 61)			Females (n = 102)			All (n = 163)	P ^a
	n ^R	No.	%	n ^R	No.	%	%	
<i>Should pay attention to what one eats from early childhood</i>	58	40	69.0	102	76	74.5	72.5	NS
<i>Perception of own diet</i>	58			101				
Well-balanced		23	39.7		21	20.8	27.7	
Not well-balanced		23	39.7		61	60.4	52.8	
Don't know		12	20.7		19	18.8	19.5	< 0.05
<i>Influenced by health education</i>	59			101				
Yes		25	42.4		58	57.4	51.9	
No		20	33.9		21	20.8	25.6	
Don't know		14	23.7		22	21.8	22.5	NS
<i>Prefer street foods</i>	59			101				
Yes		18	30.5		44	43.6	38.8	
No		30	50.8		43	42.6	45.6	
Don't know		11	18.6		14	13.9	15.6	NS
<i>Watch television while eating</i>	59	47	79.7	99	73	73.7	75.9	NS
Frequency of meals								
Breakfast daily	59	44	74.6	102	52	51.0	59.6	< 0.01
Morning snack \geq 2 days/week	58	25	43.1	100	47	47.0	45.6	NS
Lunch daily	59	55	93.2	99	89	89.9	91.1	NS
Afternoon snack	59	39	66.1	101	56	55.4	59.4	NS
Dinner daily	59	49	83.1	99	59	59.6	68.4	< 0.01
Snacking after dinner	58	33	56.9	101	33	32.7	41.5	< 0.01
		Mean (SD) score			Mean (SD) score		Mean (SD) score	
<i>Healthy diet</i>		73.6 (23.4)			68.7 (20.7)		70.6 (21.8)	NS
<i>Well-balanced diet</i>		71.6 (24.8)			79.6 (16.7)		76.6 (20.4)	< 0.05
<i>Nutrition risk factor (CVD, diabetes, obesity)^b</i>		69.7 (32.3)			75.9 (25.9)		73.7 (28.3)	NS

^aP for differences between males and females; ^bData missing for 6 males and 1 female.

n^R = number of respondents for each variable.

NS = not significant; SD = standard deviation; CVD = cardiovascular disease.

Table 2 Knowledge, perception and behaviour of adolescents in regard to physical activity (PA)

Variable	Males (n = 140)			Females (n = 220)			Total (n = 360)		P ^a
	n ^R	No.	%	n ^R	No.	%	No.	%	
<i>Definition of regular PA</i>	132			214					
Every day		14	10.6		34	15.9	48	13.9	
< 7 days/week		111	84.1		166	77.6	277	80.0	
Don't know		7	5.3		14	6.5	21	6.1	
<i>Practise regular PA</i>	131	51	38.9	206	51	24.8	102	30.3	< 0.01
<i>Intensity of PA^b is usually:</i>	136			214					
Low		11	8.1		41	19.2	52	14.9	< 0.001
Moderate		92	67.6		153	71.5	245	70.0	
High		33	24.3		20	9.3	53	15.1	
<i>Plan to do 30 min daily moderate PA next year</i>	118	65	55.1	204	116	56.9	181	56.2	NS
<i>Perception of daily moderate PA</i>									
Pleasant	131	109	83.2	212	182	85.8	291	84.8	NS
Effective	131	124	94.7	211	194	91.9	318	93.0	NS
Easy	129	41	31.8	208	55	26.4	96	28.5	NS
<i>Sport activity in past week</i>									
Walking	140	95	67.9	220	163	74.1	258	71.7	NS
Dancing (1 female ^c)	140	33	23.6	219	131	59.8	164	45.7	< 0.001
Jogging	140	67	47.9	220	90	40.9	157	43.6	NS
Physical education	140	53	37.9	220	96	43.6	149	41.4	NS
Soccer	140	73	52.1	220	10	4.5	83	23.1	< 0.001
Bodybuilding	140	49	35.0	220	28	12.7	77	21.4	< 0.001
Cycling (1 female ^c)	140	30	21.4	219	14	6.4	44	12.3	< 0.001
Volleyball/basketball	140	19	13.6	220	17	7.7	36	10.0	NS
Swimming	140	7	5.0	220	7	3.2	14	3.9	NS
<i>Determinants of PA</i>									
Encouraged by mother	137	102	74.5	218	181	83.0	283	79.7	0.050
Encouraged by father	135	97	71.9	218	141	64.7	238	67.4	NS
<i>Reason for not doing sport (%)</i>	140	Yes	No	220	Yes	No	Yes	No	
Lack of time		57.1	24.3		75.5	14.1	68.3	18.1	< 0.01
Lack of space		48.6	32.1		47.7	40.9	48.1	37.5	NS
Lack of facilities		42.1	35.7		28.6	57.7	33.9	49.2	< 0.001
Those practising sport are not all good people		29.3	50.7		23.2	63.2	25.6	58.3	NS
Sport not a tradition in our neighbourhood		19.3	60.7		25.9	60.0	23.3	60.3	NS
I like watching not playing		13.6	66.4		28.6	59.1	22.8	61.9	< 0.01
Financial problem		25.7	54.3		19.1	67.7	21.7	62.5	< 0.05
Health problem		13.6	65.0		14.1	73.2	13.9	70.0	NS
I don't like to		6.4	73.6		15.9	70.9	12.2	71.9	< 0.05
Parents don't want me to		11.4	67.9		8.2	79.5	9.4	75.0	< 0.05

^aP for differences between males and females; ^bSelf-assessed; ^cRemainder = no response.

n^R = number of respondents for each variable.

NS = not statistically significant.

Apart from school physical education sessions, about 90% of the participants said they had done some sport during the week preceding the survey (Table 2), mainly walking (71.7%). Lack of time (68.3%), space (48.1%) and facilities (33.9%) were the main hindrances to practising sports.

Perception of quality of life

Figure 1 shows mean norm-based scores for the 8 scales and the 2 summary components of health-related quality of life. Norm-based scores were generally < 50 or close to 50. The mean score for MCS was lower than that for PCS for both girls and boys. Girls assessed their physical and mental health worse than boys for most of the components ($P < 0.05$), except for physical role, which was not statistically significant. Vitality (VT score) was significantly higher in the overweight group (51.2, SD 9.1 versus 46.9, SD 11.6; $P < 0.05$). There was no significant association with overweight in any score for boys, while there were significant differences for girls for VT score ($P < 0.01$) and for mental health and MCS scores ($P < 0.05$). More girls than boys also perceived themselves as being stressed: mean for perceived stress scores were 46.5 (SD 21.7)

for girls and 60.5 (SD 16.5) for boys ($P < 0.001$) (Table 3).

Tobacco and alcohol consumption

About a third of respondents declared having smoked at least once in their life (Table 4). For *shisha* (traditional water pipe), the proportion was lower than for cigarettes but significantly higher for boys (25.6%) than for girls (4.8%) ($P < 0.01$). For smoking in general, 87.7% recognized that their parents were against it or would rather they did not smoke. More than 90% knew that smoking was considered to be a risk factor for certain diseases.

Significantly more boys (28.6%) than girls (7.1%) admitted having consumed alcohol at least once ($P < 0.001$), mainly from shops or the black market (Table 4). Most participants (87.3%) also recognized that their parents were against drinking or would prefer them not to drink.

Sources of health education

The main sources of health education were mass media (58.8%) and medical staff (35.6%) (Table 4). Although boys reported relying on mass media more frequently than girls, the difference was not significant.

Table 3 Perceived Stress Scale score by sex

Variable	Males		Females		Total		P			
	No.	Score	No.	Score	No.	Score				
	Mean	SD	Mean	SD	Mean	SD				
<i>In the last month, how often have you felt:</i>										
You were unable to control the important things in your life?	52	60.6	29.9	121	44.4	31.7	173	49.3	32.0	< 0.01
Confident about your ability to handle personal problems?	52	62.0	24.0	123	52.0	31.6	175	55.0	29.9	< 0.05
Things were going your way?	52	72.6	24.4	123	52.6	26.2	175	58.6	27.2	< 0.001
Things were piling up so high you could not overcome them?	51	46.6	24.5	123	38.4	26.1	174	40.8	25.8	0.058
Perceived Stress Scale score	51	60.5	16.5	121	46.5	21.7	172	50.7	21.2	< 0.001

SD = standard deviation.

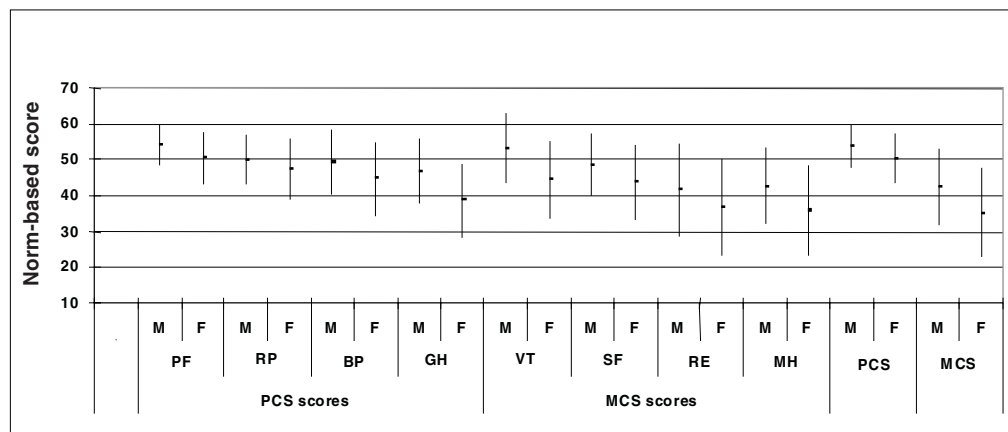


Figure 1 Health-related quality of life according to sex showing mean (standard deviation) scores (M = males, F = females, PCS = physical component summary, MCS = mental component summary, PF = physical functioning, RP = role-physical, BP = bodily pain, GH = general health, VT = vitality, SF = social functioning, RE = role-emotional, MH = mental health)

Discussion

We found a high rate of youth overweight based on the IOTF definition, i.e. about 1 in 5 youth attending school. Comparison of our results with other studies should be done with caution because of the different classifications used to define overweight and obesity and population age. Our rate is close to the highest rate reported (overweight 25.4%; obesity 7.9%) in Europe in school-aged youth (10–16 years) in the 34 countries that took part in the Health Behaviour in School-Aged Children study, in which a similar methodology was used [22].

Tunisia is now facing an epidemic of obesity linked to a rapid food and lifestyle transition similar to that observed in neighbouring countries of the Eastern Mediterranean Region [23]. Food consumption patterns and dietary habits in this region have changed markedly during the past 4 decades. There has been an increase in per

capita energy and fat intake in all countries, and changes in lifestyle and socioeconomic status in the region have had a significant effect on physical activity. Television advertising, long periods spent watching television and on the Internet, high intake of fast foods, and an increase in food intake outside the home have also been reported to be associated with obesity among children and adolescents in some countries in the region [23]. Significantly, a large percentage of both boys and girls in this survey reported regularly watching television whilst eating.

Young people attending school appeared to have sufficient knowledge about health. However, our results indicated a considerable gap between dietary knowledge and dietary behaviours, especially among girls (skipping meals, a preference for street food, and perception of not having a well-balanced diet). Our results are at odds with some observations reporting that girls tend

Table 4 Smoking and drinking: knowledge and behaviour by sex

Variable	Males (%) (n = 53)			Females (%) (n = 123)			Total (%) (n = 176)		P ^a
	n ^R	No.	%	n ^R	No.	%	No.	%	
<i>Smoking tobacco</i>									
Have smoked a cigarette at least once in your life	51	23	45.1	110	33	30.0	56	34.8	NS
Have smoked shisha at least once in your life	43	11	25.6	105	5	4.8	16	10.8	<0.01
<i>Parents' point of view about smoking by youth</i>									
Against/prefer me not to smoke	49			114					
Don't know/they don't mind		41	83.7		102	89.5	143	87.7	
		8	16.3		12	10.5	20	12.2	NS
<i>Smoking is a risk factor for:</i>									
Respiratory disease	52	51	98.1	123	120	97.6	171	97.7	NS
Cardiovascular disease	50	44	88.0	118	112	94.9	156	92.9	NS
Cancers	53	51	96.2	121	115	95.0	166	95.4	NS
Reduction in physical ability	50	43	86.0	118	104	88.1	147	87.5	NS
<i>Alcohol use</i>									
Have drunk alcohol ≥ 1	49	14	28.6	112	8	7.1	22	13.7	<0.001
<i>Knowledge about sources of alcohol for youth^b:</i>									
	42			100			142		
Shop		30	71.4		57	57.0	87	61.3	NS
Black market		19	45.2		57	57.0	76	53.5	NS
Available at home		8	19.0		24	24.0	32	22.5	NS
Self production		1	2.4		7	7.0	8	5.6	NS
<i>Parents' point of view about drinking by youth</i>									
Against/prefer me not to drink	46			104					
Don't know/other answers		38	82.6		93	89.4	131	87.3	
		8	17.4		11	10.6	19	12.7	NS
<i>Main source of health education</i>									
	48			112					
Medical staff		11	22.9		46	41.1	57	35.6	
School/family		3	6.3		9	5.4	9	5.6	
Mass media		34	70.8		94	53.6	94	58.8	NS

^aP for differences between males and females; ^bStudents could choose more than 1.

n^R = number of respondents for each variable.

NS = not statistically significant.

to have a healthier diet than boys [24,25], as they are more likely to adopt prevention strategies for their health [26]. However this does not appear to be the rule [27,28]. It is recognized that knowledge about healthy food choices can be a predisposing factor for the adoption of a healthy diet but

it is insufficient to motivate healthy eating; many other factors (e.g. psychosocial and demographic) also play a role [26,29]. Specific cultural factors can explain the widespread prevalence of overweight, particularly among married women, as female fatness has traditionally been viewed as

a sign of social status and as a symbol of beauty and fertility [12,30]. However, another study in the region showed that the ideal body image of overweight and obese adolescents was significantly slimmer than their current body image, a clear sign of cultural transition [31].

Our study also showed that most of the young people at school had an insufficient level of physical activity. Less than half practised weekly physical activity at school although up to 79% declared having practised sport some time during the week preceding the survey. While they were largely unaware of the recommended frequency of daily moderate physical activity, the young people expressed willingness and a consciousness of the benefits of practising regular physical activity. Most of the young people in our study considered that practising sport is pleasant, but cited a number of hindrances. An insufficient level of sport was observed more than 10 years ago in 1993 during a nation-wide study in Tunisia [10]: only 49.3% of youth (17–24 years) who lived in the Tunis region (including the Ariana neighbourhood) declared they practised a sport.

Using the SF36 instrument, self-ratings of general health are among the most commonly used measures of health status. They are thought to be good predictors of mortality, irrespective of the method of measurement. Even though it is mostly employed with adults, the instrument is also adapted for use with young people [32].

We found a significant association between some health-related quality of life scores and overweight for girls, but not for boys. Such an association was recently described for Australian children, weak for overweight, and more marked for obesity [33]. Pinhas-Hamiel et al. found a statistically significant relationship between BMI and general and physical health but not psy-

chosocial outcomes [34]. This indicates that girls worry more about overweight than boys in the Tunisian school population; in boys, it may express the absence of physical impairment linked to the low level of obesity; or alternatively, a lower level of consciousness, or a better social acceptance of moderate overweight. Boys rated better than girls for each separate and synthetic score. Girls also reported a more frequent perception of not having a well-balanced diet or being more stressed on average than boys. This is in agreement with studies that explored the psychological status of youth [35,36]. While children report a very good quality of life, which is largely independent of gender, adolescents have a lower health-related quality of life score; and a larger decrease was found for females than males [37]. Stress appears more frequently in females, although it does not seem to play a significant role in differences in health [38,39]. Gender disparities, not unique to Tunisian youth, could be related to many factors such as disparities in the level of physical activity, the importance of body image, health considerations and social discrimination.

Overall, tobacco smoking among youth is less pronounced in Tunisia than in more-industrialized countries. In the USA 58% of people aged 10–24 years had smoked at least once [40], and this was also the case for 70% of 14–20 year-old students in Spain [41], while in our study only 35% of young people aged 15–23 attending school had already smoked. This is consistent with the conclusion of a recent world review of global tobacco use in 13–15-year-olds attending school which showed that, on the whole, Eastern Mediterranean Region youth are currently less exposed to cigarette use than young Europeans and Americans [42] although the use of other tobacco products like the water-pipe is gaining popularity among boys.

About 75% of youth in the USA and 85% in Spain had tried alcohol [40,41], while in Tunisia only 29% of males and 7% of females had done so. Similar results were reported in other studies in Arab countries [43,44] with significantly lower levels of addiction, specifically among females.

This study provides new and recent information on health status and various health perceptions or behaviours of youth at school in an actively urbanizing area of the capital of Tunisia. Its main strength is to present gender differences in perceived health-related quality of life, which had not been investigated previously in this young population. There are clear limitations due to the difficulty Tunisian youth have accepting long interviews or self-administered questionnaires on their personal behaviours during school hours, which led us to distribute the different questionnaires to different groups. The use of smaller sub-groups may have contributed to a loss of power in stratified analyses and precluded cross analyses between main themes. However,

it ensured very high return and completion rates and probably fewer biases in the answers. Anonymous written self-reports in the form of questionnaires filled out at school also avoided any direct influence by other members of the family.

In conclusion, our study suggests the need to implement a relevant strategy for health promotion among children and youth as part of a national programme to prevent diet-related chronic diseases. This should be gender sensitive as the magnitude of the problems is different for both males and females.

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