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Non-Communicable Diseases Behavioral Risk Factors among Palestinian Adolescents: A Descriptive Study from a Rural Community of Tarqumia

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Abstract: Currently, the burdens of non-communicable diseases are escalating rapidly in low-income countries like Palestine. Epidemiologic transition coupled with negative effects of globalization are largely blamed for changing lifestyle among poor countries that put them at high risk of developing non-communicable diseases. This study aimed to estimate the prevalence of various behavioral risk factors for chronic diseases. A descriptive cross-sectional quantitative study was conducted from February 2011 to April 2011 in a rural community of Palestine. The three major risk factors observed among participants were low fruits and vegetables consumption, tobacco use and high levels of physical inactivity. Almost one third (32.2%) of them were current smokers. Nearly eight of ten of the target population (84.6%) were physically inactive. More than 90.5% of them reported low consumption of fruits and 88.1% reported poor consumption of vegetables. The major behavioral risk factors for non-communicable diseases were very clear with the vast majority of the population have been involved in at least one risk factor. The increased risk observed among the younger generation for behavioral risk factors calls for urgent long-term health promotion and disease prevention activities, adequate and continuous monitoring for all major NCDs risk factors.

Key words: Non-Communicable Diseases · Risk Factors · Overweight · Obesity · Dietary Behavior · Palestine

INTRODUCTION

Worldwide, non-communicable diseases (NCDs), include heart attacks, strokes, certain cancers, diabetes, chronic respiratory diseases and other chronic diseases has escalated to epidemic proportions, causing over 35 million annual deaths, represents about two thirds of the deaths that occurred globally. Although NCDs affect people of all ages, from all social classes and all nationalities; low- and middle-income countries now contribute a larger proportion of NCDs globally than do affluent countries [1]. By 2030, nearly eighty percent of those deaths come from low- and middle-income countries, with the projection of about 52 million deaths annually [2]. By 2060, it is projected that deaths from NCDs will outnumber deaths from communicable diseases by more than five to one and are projected to account for about three out of four deaths in the whole world by 2020 [3].

The risk factors for these NCDs include unhealthy diets, overweight or obesity, harmful uses of alcohol and tobacco use, suboptimal intake of fruit and vegetables and physical inactivity [4]. These risk factors are associated with modifiable behaviors that are initiated or are reinforced during adolescence and extend to adulthood, consequently, in order to attenuate incidence of future NCD cases, risk factors in adolescents should be reduced. Previous study had proven that healthy dietary habits and increased physical activity play critical roles in maintaining health and preventing NCDs [5].

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Adopting unhealthy lifestyles, such as (a) unhealthy dietary behaviors [7-9], including: consuming fast foods [8, 10, 11] and drinking soft drinks [8, 12, 13], (b) being physically inactive [14-17]; (c) and tobacco consumption have been blamed as a common contributing risk factors to majority of NCDs including cardiovascular diseases [14, 18], certain cancers [9, 19, 20], diabetes mellitus (DM) [21-24], metabolic syndrome [21], hypertension [25], overweight and obesity [7, 12, 22, 26-28], (d) urbanization [29]. However, NCDs could be mitigated by adopting healthy lifestyles such as avoid tobacco and alcohol use, consuming healthy diet, increase physical activity and the harmful use of Ministry of Health [30].

In Palestine, NCDs account for61.1% of deaths, of which 26.1% for heart diseases, 11.8% for cerebrovascular disease followed by 11% for cancers, 8.4% for respiratory disorders and 3.9% for hypertensive diseases. This burden is projected to worsen due to the epidemiological and demographic transition that is taking place in Palestine [31, 32].

Thus the purpose of this study was to determine the age and sex specific prevalence and associated NCDs risk factors (overweight &obesity, smoking, physical activity and other dietary behaviors (including fruits &vegetables intake, consumption of fast food and soft drinks) in adolescents aged 13 – 17 years old in south Palestine, which hitherto has not been documented. We hope the result of this study will help unfold the required interventions necessary to reduce incidence and hence morbidity and mortality associated with NCDs in Palestine and similar countries all over the world.

MATERIALS AND METHODS

Study Site and Population: The study was part of a school-based descriptive cross-sectional quantitative design. It was conducted in the southern rural area of Hebron governorate in Palestine, from February to the end of March 2011. The study area was randomly selected.

The study population included school adolescents, grade 7 through 11enrolled in the four public schools and who consented to participate in the study. A stratified simple random technique (proportionate sampling) was used to select students from each class level in the four selected schools then simple random sampling without replacement was employed to select the required students from each class. A total of 720 students were initially invited to participate in the study. Of the seven hundred twenty students who met the inclusion criteria, 363 were boys and 357 were girls, aged 13-17 years. Informed consent was obtained from participants and study protocol was approved by the committee of the Palestinian Ministry of Education.

Data Collection: Data was collected by the researcher after explaining the aims of the study. Consent forms, physical measurements and questionnaire were performed by the researcher himself. All students enrolled in the academic years 2011/2012 was proportionately sampled. The following socio-demographic were collected: age, sex and grade. The students were continuously supervised by the researcher during the data collection process.

Study Tools

Questionnaire: Data was collected through anonymous self-administered questionnaires (Arabic version of the international Global School-Based Health Survey (GSHS)). The questionnaire included questions regarding demographic characteristic of the respondents, BMI, soft drinks and fast food consumption, tobacco use, physical activity and fruit and vegetable consumption.

Anthropometric Measurements: Height and weight were measured. Body mass index (BMI) was calculated by dividing weight in kg by square of height in meters (kg/m2) to classify overweight and obesity among children and adolescents. Cut-off point for overweight was defined as BMI ≥ 85th percentile of a sex-specific BMI for age and the obesity cut-off point was defined as a BMI ≥ 95th percentile of a sex-specific BMI for age based on the International Obesity Task Force. Anthropometric variables included body weight and height.

Operational Definitions: The definitions used for the study were based on the briefly described WHO GSHS survey:

- Overweight and obesity: described above within anthropometric Measurements.
- Current smoker: respondents who consumed tobacco on one or more days in the previous 30 days were considered current smokers.
- One serving of vegetable: one cup of raw, leafy green vegetables (spinach, salad, etc.), one half cup of other vegetables, cooked or raw (tomatoes, pumpkin, beans etc.), or half cup of vegetable juice;

- One serving of fruit: one medium-sized piece of fruit (banana, apple, etc.) or half cup of raw, cooked or canned fruit, or a half cup of juice from a fruit (not artificially flavored);
- Physical activity: it included questions on number of days and time spent (1 hour daily) on vigorous and/or moderate activities at work; travel to and from schools.

Data Management and Analysis: The filled questionnaires were thoroughly checked by the researchers for any inconsistencies. Data coding and cleaning were done. Data was entered and analyzed with SPSS version 20.0. Descriptive analysis was done; mean with standard deviations was calculated for continuous variables and percentages were calculated for categorical variables. The BMI values were fed into WHO AnthroPlus software that produced z-scores which adjusted for gender and age of the children. SPSS, version 20 was used to analyze the data.

Ethical Consideration: The study obtained approval from Ethical Review Committee of the Palestinian Ministry of Education. Written Informed students' consent was obtained from each student after the objectives of study had been explained prior to data collection. The participants were informed about their right to decline or withdraw from the study, any time in the process. We used an anonymous questionnaire that did not contain the name or the address of students, therefore privacy and confidentiality were thoroughly maintained. In addition, there were no physical risks as there was no intervention such as blood sampling done during the study.

RESULTS AND DISCUSSION

Demographic Characteristics: Of the 720 students, 363 (50.4%) were boys and 357 (49.6%) were girls. Students' ages ranged from 13 to 17 years, with the mean age 15.08 years (SD = 1.38). There were 121 (62 male & 59 female) 7th grade, 148 (70 male & 78 female) 8th grade, 155 (79 male & 77 female) 9th grade, 148 (74 male and 74 female) 10th grade and 148 (78 male & 70 female) 11th grade students (Table 1).

Behavioral Risk Factors: The rural and south remain neglected part compared to urban and north parts in terms of exploring their burden of behavior risk factors and prevalence of NCDs among them. The findings of this study provide evidence on a substantially high rate of prevalence of some of the behavioral risk factors among adults in the community, especially the habit of smoking, low physical activity and low consumption of fruits and vegetables.

Prevalence of Overweight and Obesity: According to their body mass index, almost one fifth of the respondents (23.4% of males and 13.7% of females) were overweight, while 9.2% (11.0% for males and 7.3% for females) were obese (Table 4). In the males, prevalence of overweight was the highest in both the ≤13 years and in 14-15 years groups (28.6%) while females had the highest percent (16.8%) of overweight in the 14–15 years group (Table 4). Both overweight and obesity rates were found to be higher in males than in females in our study population.

Unlike the other studies from Saudi Arabia, Bahrain and Iran, the problem of high BMI is found to be more in males than in females in our study population, where the prevalence of overweight and/or obesity were higher among females [32-34]. Whereas, the other studies from China and India, where high BMI is found to be more in male than in females were consistent with our study population [35, 36].

Lifestyle changes including increased caloric intake, decreased consumption of fruits and vegetables, combined with an increase in physical inactivity and sedentary lifestyle, have contributed to rapidly escalating rates of non-communicable diseases, making them the leading cause of mortality in Palestine. This is true, because the traditional Arabs food has already been replaced by a more westernized food that contains high calories and fat and low vegetables and fiber [37].

The exact reasons for overweight and obesity have not yet been sorted out clearly, but there are some believed contributing factors including: family history, unhealthy dietary habits, increased consumption of calorie-dense foods, fewer opportunities for physical activity, sedentary lifestyle, increased levels of stress, parents' level of education, daily sleeping hours, family income and other demographics such as age and gender [38].

Fruit and Vegetable Intake: The mean fruit consumption was less than two serving per day with about 22.4% taking fruits less than once daily (Table 3). Comparatively, vegetable consumption was less than two serving per day with about 18.2% taking vegetables less than once daily k. More than five servings of fruit and vegetables are recommended for healthy living, but 88.0% males and

Table 1: Demographic characteristics of the study population (n = 720).

	Male		Female	
Characteristics	N	%	N	%
Age/years				
13	63	17.3	59	16.5
14	75	20.7	67	18.8
15	69	19.0	87	34.3
16	79	21.8	74	20.8
17	77	21.2	70	19.6
Total	363	357		
Age-group/years				
≤13	63	17.4%	59	17.4%
14 - 15	144	39.7%	154	43.1%
≥16	156	43.0%	144	40.3%
Total	363	357		
Grades				
7th grade	62	17.1	59	16.5
8th grade	70	19.3	78	21.8
9th grade	79	21.8	76	21.4
10th grade	74	20.4	74	20.7
11th grade	78	21.4	70	19.6
Total	363	357		

Table 2: Prevalence (%) of overweight and obesity among the sample of adolescents by age and gender (n= 720, 363 male & 357 female)

	Underweight		Normal weight		Overweight		Obesity		
Demographic data	Male	Female	Male	Female	Male	Female	Male	Female	Total number
Age-group (years)									
≤ 13	3.2	0.0	54.0	69.5	28.6	20.3	14.3	10.2	122
14-15	2.7	3.3	52.3	73.3	28.6	12.7	16.8	10.7	299
≥ 16	1.3	3.4	78.1	81.8	16.6	12.2	4.0	2.7	299
Total%	2.2	2.8	63.4	76.2	23.4	13.7	11.0	7.3	720
Total number	8	10	230	272	85	49	40	26	

Table 3: Fruit and vegetable consumption in the study population (n = 720). One serving of fruit means one medium-sized piece of fruit (banana, apple, etc.) or half cup of raw, cooked or canned fruit, or a half cup of juice from a fruit (not artificially flavored). One serving of vegetable is one cup of raw, one half cup of other vegetables, cooked or raw (tomatoes, pumpkin, beans, etc.)

	Male (n=363)		Female (n=357)		Total	
Serving/day	n	%	n	%	n	%
Fruit consumption						
0	89	24.5%	72	20.2%	161	22.4%
1-2	165	45.5%	182	51.0%	347	48.1%
3-4	76	20.9%	83	23.2%	159	22.1%
≥5	33	9.1%	20	5.6%	53	7.4%
Total ≤ 5	241	88.0%	265	93.0%	506	90.5%
Mean (SD)	3.1 (1.6)	3.35 (1.5)	3.2 (1.6)			
Vegetable consumption						
0	77	21.2%	54	15.1%	131	18.2%
1-2	187	51.5%	205	57.4%	392	54.4%
3-4	65	17.9%	62	17.4%	127	17.6%
≥5	34	9.4	36	10.1%	70	9.2%
Total ≤ 5	252	88.1%	267	88.1%	519	88.1%
Mean (SD)	3.1 (1.5)		3.2 (1.5)		3.1 (1.5)	

Table 4: Prevalence of tobacco use among the sample of adolescents by age and gender (n = 720)

	Gender		
Days/month	Male (n &%)	Female (n &%)	Total (n &%)
0	191 (52.6%)	297 (83.1)	488 (67.8%)
1-2	38 (10.5%)	43 (12.0%)	81 (11.2%)
3-5	17 (4.7%)	4 (1.1%)	21 (2.9%)
6-9	34 (9.4%)	2 (0.6%)	36 (5.0%)
10-19	21 (5.8%)	7 (1.9%)	28 (3.9%)
20-29	18 (4.9%)	2 (0.6%)	20 (2.8%)
All 30 days	44 (15.7%)	2 (0.6%)	46 (6.4%)
Smoked cigarettes on one or more days were considered current smokers.			
Total	172 (47.4%)	60 (16.8%)	232 (32.2%)

Table 5: Prevalence (%) of physical activity in the study population according to demographic variables (n = 720). The physical activity section included questions on number of days and time spent (1 hour) on vigorous and/or moderate activities at work, travel to and from places and recreational activities

	Male (n=363)		Female (n=357)		Total	
Days/week	N	%	N	%	N	%
0	128	35.3%	126	35.3%	254	35.3%
1-3	149	41.0%	174	48.7%	323	44.8%
4-6	44	12.1%	28	7.8%	72	10.0%
Total ≥ 7 days	42	11.6%	29	7.3%	71	9.9%
Total ≤ 7 days	193	82.1%	192	86.9%	395	84.6%
Mean (SD)	2.2 (1.8)		2.1 (1.5)		2.2 (1.7)	

93.0% females consume less than the recommended five servings of fruit daily in the study area. In addition, 88.1% of males and similar percent for females consume less than the recommended five servings of vegetables daily in the study area. Our study population fared worse in comparison to other studies in the similar settings as well [39-41]. Low consumption of fruits and vegetables in the slum populations can be due to lack of health awareness, poor economic status and preference for fast food that put them at high risk of developing NCDs. Moreover, it might be related to availability and accessibility of healthier food, because when fruits and vegetables are easily accessible and are ready to be eaten, children are more likely to eat them.

Tobacco Consumption: Distribution of smoking based on age-gender is presented in (Table 4). The survey indicated that the prevalence of current smokers in males, females and both sexes is 47.4%, 16.8% and 32.2%. Theoverall (both males and females) prevalence of smoking in the present study is higher than the reported result in previous study in Palestine 20.5% [42]. The prevalence of smoking has fallen in developed countries but has plateaued at high levels among low- and middle-income countries [2].

Level of Physical Inactivity: Almost 84.6% of the study populations have low physical activity (Table 5). This data is similar to the one from Jordan and Bahrain that showed higher prevalence of physical inactivity [40, 41]. Whereas in contrast with the high prevalence of physical activity in India [43]. Prevalence of low physical inactivity in Tarqumia is higher in the females (86.9%) than in the males (82.1%).

Fast Food and Soft Drink Consumption: Overall, 29.3% of the study population was reported eating fast food on two or more days during the past 7 days preceding the survey. Male students (40.8%) were more likely to report eating fast food than female students (17.6%). The results of this study showed that 38.8% of the study population was drinking carbonated soft drinks two or more times per day during the past 30 days preceding the survey. Male students were more likely (41.87%) to report drinking soft drink than female students 35.57% (Table 6).

Table 6: Prevalence (%) of soft drink and fast-food consumption in the study population according to demographic variables (n = 720). Soft drink consumption section included questions on number of times per day (≥ 2 times were included in the analysis). Fast-food consumption section included questions on number of days per week (≥ 2 days a week were included in the analysis)

	Male (n=363)		Female (n=357)		Total	
Age-group/ years	n	%	n	%	n	%
Soft-drink consumption ≥ 2 times daily						
≤13	27	42.8%	23	40.0%	50	41.0%
14-15	61	42.4%	53	34.4%	114	38.3%
≥16	64	41.0%	51	35.4%	115	38.3%
Total	152	41.9%	127	35.6%	272	38.8%
Fast food consumption ≥ 2 days/week						
≤13	26	41.3%	11	18.6%	37	30.3%
14-15	65	45.1%	26	16.9%	91	30.5%
≥16	57	36.5%	26	18.1%	83	27.7%
Total	148	40.8%	63	17.6%	211	29.3%

CONCLUSIONS

The prevalence of NCDs behavioral risk factors in Palestine is high, where at least half of the population having the major risk factors. Additional and continuous studies should be done to explore, monitor and address the determinants of those factors. The study findings should be used to form a platform for future planning, policy-making, implementation and evaluation of any health promotion and disease prevention activities to attenuate these risk factors.

Limitation: The study results are subject to several limitations. First, the research is cross-sectional and was not conducted throughout the year; therefore, some of the behaviors that vary seasonally (e.g., dietary intake) may not be representative. Second, some variables were self-reported, which may have resulted in self-report bias.

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