Research Article

Health-Risk Behaviors among Medical Students at Qassim University, Saudi Arabia: A Prevalence Study

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Abstract

Background and Objectives: University students have higher odds to adopt health-risk behaviors while in their emerging adulthood. These behaviors predispose students to chronic diseases, and hinder their academic achievement. Our study aimed to describe the prevalence rates and pattern of major health-risk behaviors among Saudi medical students.

Methods: This is a cross-sectional prevalence study of a representative sample of medical students in a Saudi medical college (n=428). In August 2018, data were collected on self-reported physical inactivity including sedentary behaviors, unhealthy dietary behaviors, and tobacco use. The data were analyzed using descriptive statistics, Chi-square test, and Phi-coefficient.

Results: The most prevalent health-risk behaviors were bunched around physical inactivity, ranging from 97.9% for inadequate muscle-strengthening exercises to 77.3% for high sedentary lifestyle. Less prevalent unhealthy lifestyles were bunched around tobacco use, ranging from 0.93% to current e-water-pipe smoking to 6.2% for current cigarette smoking. Furthermore, males were more likely to consume fast-food (P=0.000) and soda (P=0.002) than females. Minimal significant level of associations between unhealthy lifestyles was determined.

Conclusion: Our study showed variable prevalence rates of health-risk behaviors. Physical inactivity was the most common behavior, which should be, therefore, tackled as the top priority. Promotion of healthier lifestyle choices among medical students during their medical education will help them as they progress from being undergraduate students to being young doctors. This will ensure that they will consistently provide lifestyle education to their patients.

Keywords: Health-risk behaviors; Emerging adulthood; Medical students; Saudi Arabia

Introduction

Similar to other Arab countries, the causes of mortality and morbidity in Saudi Arabia (SA) have undergone epidemiological transition. Specifically, chronic diseases (e.g., diabetes mellitus, hypertension, cardiovascular diseases, and cancers) have replaced communicable diseases as the leading causes of mortality and morbidity [1,2]. In 2010, coronary heart disease (24.9%), hypertension (12.2%), and diabetes mellitus (6.74%) were on the top out of fifty causes of death in SA [3]. According to the 2017 annual report of the Saudi Ministry of Health [4], an estimated 13.4% and 15.1% of Saudis were diabetic and hypertensive, respectively. Despite of its resources, SA is expected to face significant challenges due to chronic diseases, which become prevalent with the aging population [5].

Currently, it is well known that health-risk behaviors, also known as unhealthy lifestyles, play an important role in the etiology of chronic diseases [6]. Among these risk behaviors, the World Health Organization (WHO) has identified three key behaviors: physical inactivity, unhealthy dietary habits, and tobacco use [6]. However, these risk behaviors are modifiable, which makes it possible to prevent chronic diseases.

Motivation and Relevance

This study aimed to investigate the status of major unhealthy lifestyles among Saudi university students. There are several reasons why unhealthy lifestyles among this segment should be given special attention. First, although commitment to a healthy lifestyle is not confined to a specific age group, the "emerging adults" group (i.e., people between 18 and 25 years of age) is of special concern [7].

Emerging adults, who are represented widely by university students, are believed to have higher tendency to adopt unhealthy behaviors than other age groups [8]. Second, a significant relationship between academic achievement and unhealthy lifestyles was found. Research showed that the healthier the students are, the more they will be able to learn, get better grades and comprehend their future goals [9,10]. Third, a literature review revealed that less attention has been given to Saudi emerging adults; most available studies targeted adolescents.

Available studies in SA reported high rates of risk behaviors, including physical inactivity [11-14], unhealthy nutritional practices [15], and tobacco smoking [16-19]. While most obtainable local studies on unhealthy lifestyles have investigated one or few lifestyles, this study sought to explore multiple unhealthy lifestyles. Research showed that unhealthy lifestyles tend to be clustered among individuals (i.e., people who engage in one risk behavior are more likely to engage in other risk behaviors) [20,21].

Research Methodology

This study aimed to investigating the status of three major

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unhealthy lifestyles among university students in Qassim University, namely physical inactivity, unhealthy dietary habits, and tobacco use. Accordingly, this study had the following objectives:

- To describe the prevalence of physical inactivity including sedentary leisure-time.

- To describe the prevalence of common unhealthy dietary habits, namely insufficient fruit and vegetable consumption, breakfast skipping, fast-food consumption, and soda and diet-soda consumption.

- To describe the prevalence of tobacco use, namely cigarette smoking, water pipe smoking, electronic cigarette smoking (e-cigarette), and electronic water pipe smoking (e-water pipe).

- To assess differences between male and female students concerning the prevalence of the above mentioned risk-behaviors.

- To examine if the targeted risk behaviors are clustered among the students (i.e., whether there are significant associations between risk behaviors).

Procedure

In August 2018, a health survey was administered to second to sixth year medical students in Qassim University with ethical approval from the subcommittee of Health Research Ethics, Deanship of Scientific Research, Qassim. First year students were excluded from the study for being in the preparatory year. For the academic year 2018/2019, a total of 709 regular students were registered, among which 64% were males. All students were invited to participate in the study.

In this cross-sectional prevalence study data were collected using a self-administered questionnaire. The questionnaire was administered to a small group of students (n=9) to obtain feedback on the questions (e.g., clarity of wording, understandability of the questions, etc.) and on the questionnaire itself (e.g., time needed to complete the questionnaire). Small modifications were applied accordingly. In the beginning of the questionnaire, an instruction sheet was placed that explained the purpose of the study, that participation was voluntary, and to assure the respondents that their responses were anonymous. The students were informed that their submission of the filled out questionnaire represented a passive informed consent. Finally, questionnaires were filled out and returned immediately to the data collectors.

Questionnaire

The questionnaire consisted of fourteen items that were primarily based on "College Student Health Survey" (CSHS) [22] in addition to a number of relevant studies [23-27]. The CSHS was developed by the Health Service of University of Minnesota to provide information about their students' health. CSHS covers multiple health-related behaviors such as substance use, tobacco use, personal safety, sexual health, nutrition, and physical activity. In this study, only nutrition, physical activity, and tobacco use were included. The questionnaire was translated from English to Arabic using parallel translation [23].

Measures

Demographics: Two demographics were included: age and gender. The respondents were asked to specify their gender (female=1, male=2) and their age (continuous variable).

Unhealthy lifestyles

Physical inactivity: Physical inactivity was assessed by determining inadequate physical activity and leisure-time sedentary behaviors

Inadequate physical activity: The status of physical inactivity was assessed by asking students to select one of six responses on how many hours they spent doing the following activities in the past 7 days (none=1; less than 0.5 hours/week=2; 0.5-2 hours/week=3; 2.5-4 hours/week=4; 4.5-6 hours/week=5; >6 hours=6):

- Strenuous exercise (heart beats rapidly) (e.g., running, aerobics, etc.)

- Moderate exercise (not exhausting) (e.g., walking quickly, baseball, etc.)

- Exercises to strengthen or tone muscles (e.g., push-ups, weight lifting/training, etc.)

Then, the responses on the three types of physical activities were dichotomized into low physical activity level (≤2 hours/week) and high physical activity level (≥2.5 hours/week) [24].

Leisure-time sedentary behaviors: For sedentary behaviors, the students indicated how many hours they spent doing the following activities on an average day (continuous):

- Watching television

- Using a computer for something that is not for work or schoolwork

- Using a handheld device for something that is not for work or schoolwork.

The total amount of time students spent daily on sedentary leisure activities was calculated by summing scores of the 3 above mentioned activities. Then, the responses were dichotomized into low level of sedentary behavior (≤ 2 hours/day) and high-level of sedentary behavior (>2 hours/day) [25].

Unhealthy dietary behaviors: Unhealthy dietary behaviors included: insufficient fruit and vegetable consumption, breakfast skipping, fast-food consumption, soda consumptions, diet-soda consumption, and energy drink consumption.

Insufficient fruit and vegetable consumption: The students were asked to report how many times in the past seven days they consumed: 100% fruit juice, fruits, green salad, potatoes (not including fried potatoes), carrots, and other vegetables. Daily intake of fruits and vegetables was determined by dividing the total portions consumed by 7. Then, status of consumption was dichotomized into insufficient fruit and vegetable consumption (<5 servings of fruits and vegetables/day) and sufficient fruit and vegetable consumption (≥5 servings of fruits and vegetables/day) [25].

Breakfast skipping: The students were asked to report how many times they ate breakfast during the past 7 days (continuous). Then, the responses were dichotomized into breakfast skipper (eating breakfast <5 days/week) or breakfast eater (eating breakfast ≥5 days/week) [25].

Fast-food consumption: The students were asked to report how many times they ate fast-food during the past 7 days (continuous). Then, the responses were dichotomized into fast-food consumer (eating fast-food ≥3 times/week) or fast-food non-consumer (eating fast-food <3 times/week) [26].

Soda consumption: The students were asked to report how many times they drank soda or pop during the past 7 days (continuous). Then, the responses were dichotomized into soda consumer (drinking soda ≥1/day) or soda non-consumer (drinking soda <1/day) [27].

Diet-Soda consumption: The students were asked to report how many times they drank diet-soda or pop during the past 7 days (c).

Then, the responses were dichotomized into diet-soda consumer (drinking soda ≥1/day) or diet soda non-consumer (drinking soda <1/day) [27].

Energy drink consumption: The students were asked to report how many times they drank energy drinks during the past 7 days. Then, the responses were dichotomized into energy drink consumer (consuming energy drinks ≥3/week) or energy drink non-consumer (consuming energy drinks <3/week) [28].

Tobacco use: Tobacco use included current cigarette smoking, water pipe smoking, e-cigarette smoking, and e-water pipe smoking.

Current cigarette smoking: The students were asked to report how often they smoked cigarettes during the past 12 months (did not use=1; once/year=2; 6 times/year=3; once/month=4; more than once/month=5). Then, the responses were dichotomized into current cigarette smokers (smoking ≥1 day/month during the past 12 months) or non-current smokers (smoking <1 day/month during the past 12 months).

Current water pipe smoking: The students were asked to report how often they smoked a water pipe during the past 12 months (did not use=1; once/year=2; 6 times/year=3; once/month=4; more than once/month=5). Then, the responses were dichotomized into current water pipe smokers (smoking ≥1 day/month during the past 12 months) or non-current water pipe smokers (smoking <1 day/month during the past 12 months).

Current e-cigarette smoking: The students were asked to report how often they smoked an electronic cigarette (e-cigarette) during the past 12 months (did not use=1; once/year=2; 6 times/year=3; once/month=4; more than once/month=5). Then, the responses were dichotomized into current e-cigarette smokers (smoking ≥1 day/month during the past 12 months) or non-current smokers (smoking <1 day during the past 12 months).

Current e-water pipe smoking: The students were asked to report how often they smoked a water pipe during the past 12 months (did not use=1; once/year=2; 6 times/year=3; once/month=4; more than once/month=5). Then, the responses were dichotomized into current e-water pipe smokers (smoking ≥1 day/month during the past 12 months) or non-current smokers (smoking <1 day during the past 12 months).

Statistical analyses

The data were entered and analyzed using the SPSS version 20 statistical software (SPSS Inc., Chicago, Illinois). Frequencies and Descriptive were used to provide an overall picture of the sample population. Frequencies and percentages were used to calculate the prevalence of risk behaviors. The Chi-square test was performed to test differences in unhealthy lifestyles between male and female students. The relationships between risk behaviors (present/absent) were analyzed using phi-coefficient (φ).

Results

Characteristics of the sample

Out of the 709 students invited to participate in the study, 428 (60.4%) returned valid questionnaires. The mean age of the total sample was 23.0 years (SD=1.41), among which 57.9% were males and 42.1% were females.

Prevalence rates of unhealthy lifestyles

As shown in Table 1 and Figure 1, the prevalence rates of unhealthy behaviors varied from 97.9% to 0.93%. Regarding physical inactivity, the vast majority of students did not perform vigorous (97.9%), moderate (95.9%) and muscle strengthening (86.6%) exercises for 2.5 hours or more during the past week. However, the majority of them (77.3%) spend no less than 2 hours per day on sedentary activities (TV, computers and handheld devices). With respect to unhealthy dietary habits, approximately 70% of students did not consume the daily recommended 5 servings of fruits and vegetables. Additionally, approximately one third of the students (33.0%) skipped breakfast at least 3 times last week. Regarding fast-food consumption, approximately half of the students (52.1%) ate fast-food 3 times or more per week. Soda and diet-soda consumption were less widespread with prevalence of 21.9% and 8.2%, respectively. With respect to tobacco use, only 6.2%

Risk Behavior	Total (%) (n=428)	Gender		P-value*
		Female (%) (N=180)	Male (%) (N=248)	
Physical Inactivity				
Inadequate vigorous exercise (≥2.5 hours/week)	97.90%	97.20%	98.40%	0.61
Inadequate moderate exercise (≥2.5 hours/week)	86.60%	83.30%	88.5	0.33
Inadequate strengthening exercise (≥2.5 hours/week)	95.90%	100%	93.40%	0.15
High–level sedentary behavior (>2 hours/day)	77.30%	80.60%	75.40%	0.37
Unhealthy Dietary Habits				
Insufficient fruit & vegetable consumption (<5 servings/day)	69.60%	60.60%	74.60%	0.12
Breakfast skipping (≥3 days in the pasts week)	33.00%	27.80%	36.10%	0.27
Fast-food consumption (eating fast food ≥3 times/week)	52.10%	25.00%	68.30%	0
Soda consumption (drinking soda≥1/day)	21.90%	5.60%	31.70%	0.002
Diet-soda consumption (drinking diet soda≥1/day)	8.20%	5.60%	9.80%	0.37
Energy Drinks consumption (drinking energy drinks ≥3/week)	6.20%	2.80%	8.20%	0.27
Tobacco Use				
Current cigarette smoking (smoking ≥1day during the past 30 days)	6.20%	0.00%	9.80%	0.06
Current water-pipe smoking (smoking ≥1day during the past 30 days)	4.20%	0.00%	6.70%	0.15
Current E-cigarette smoking (smoking ≥1day during the past 30 days)	0.93%	0.00%	1.50%	0.11
Current E-water-pipe smoking (smoking ≥1day during the past 30 days)	1.90%	2.50%	1.50%	0.39
*Significant Associations are typed in bold				

Table 1: Prevalence rates of the health-risk behaviors by gender (n=428).

and 4.2% of the students were current cigarette smokers and water pipe smokers, respectively. With respect to tobacco use, only 6.2% and 4.2% of the students were current cigarette smokers and water pipe smokers, respectively. Additionally, the use of e-cigarettes (0.93%) and e- water pipe (1.9%) was less common.

Gender differences in unhealthy lifestyles

There were only a few significant differences between male and female students in the prevalence of unhealthy behaviors; males consumed more fast-food and more soda than females (Table 1).

Associations between unhealthy lifestyles

As shown in Table 2, very few significant relationships were found between the unhealthy lifestyles. First, students who did not perform adequate vigorous exercises were more likely not to perform adequate moderate exercises. Second, fast-food consuming students were more likely to drink soda. Third, cigarette smoking students were more likely to use other types of tobacco.
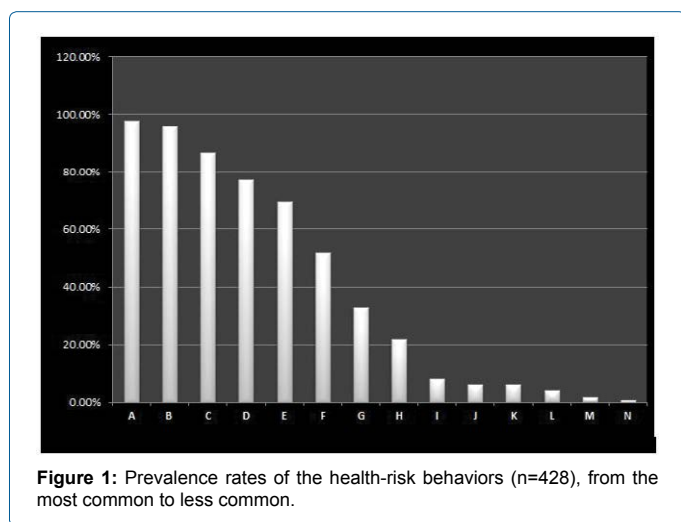
Discussion

Figure 1: Prevalence rates of the health-risk behaviors (n=428), from the most common to less common.

This study aimed to determine the status of physical inactivity, unhealthy dietary habits, and tobacco use as major unhealthy lifestyles among medical students at Qassim University.

The first objective of this study was to describe the prevalence of physical inactivity including sedentary leisure-time. High levels of physical inactivity were revealed in term of vigorous (97.9%), moderate (86.6%) and muscle-strengthening exercises (95.9%). Moreover, sedentary behaviors were also prevalent (77.3%). Our results are consistent with most available local studies, which also showed high-level of physical inactivity reaching up to 99% [11-19,29]. Although the research showed an abrupt decrease in the level of physical activity among teenagers after they transition to universities [30], Saudi students presented a more challenging scenario. Generally, high-levels of physical inactivity in SA maybe attributed to the rapidly rising levels of urbanization in addition to the presence of multiple barriers to physical activity including extreme weather, lack of sport facilities, and other cultural barriers [11,31]. Moreover, Saudi females encounter more barriers/restrictions to participation in sport activities including familial, governmental, cultural, educational, and personal barriers [31]. Fortunately, the ambitious plan of "Saudi Vision 2030" has created opportunities for promoting physical activity and for reducing sedentary behavior among the whole entire Saudi population.

The second objective was to describe the prevalence of a set of critical unhealthy dietary habits. The results showed variations in the prevalence of unhealthy nutritional practices. Insufficient fruit and vegetable intake (69.6%) was most prevalent, and energy drink intake (6.2%) was least prevalent. Most of the results are in agreement with the available local data [14,15,32]. Comparable to many other Arab countries, SA has undergone a "nutrition transition" and increased intake of Western food. This resulted in vegetables, fruits, and fiber-rich foods being substituted with foods that are high in fat, sugar, and salt. However, the result on low consumption of energy drinks is inconsistent with previous local studies, which reported that one-third to one half of university students, including medical students, regularly consumed energy drinks [32,33]. Because the most recent data collection in the above mentioned studies occurred 4 years ago, there may have been a change in the trend of energy drink consumption. Therefore, more national data are needed to test the hypothesis that

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
A	1	-	-	-	-	-	-	-	-	-	-	-	-	-
B	0.16	1	-	-	-	-	-	-	-	-	-	-	-	-
C	0.34	0.1	1	-	-	-	-	-	-	-	-	-	-	-
D	-0.08	0.1	-0.05	1	-	-	-	-	-	-	-	-	-	-
E	-0.1	0.1	-0.1	0.03	1	-	-	-	-	-	-	-	-	-
F	0.01	0.11	0.11	-0.04	0.01	1	-	-	-	-	-	-	-	-
G	-0.05	-0.05	-0.05	0.07	0.1	-0.05	1	-	-	-	-	-	-	-
H	-0.1	-0.01	-0.01	0.17	0.18	0.26	0.01	1	-	-	-	-	-	-
I	0.04	-0.03	-0.04	0.07	0.19	0.03	-0.01	0.39	1	-	-	-	-	-
J	0.09	0.09	0.09	0.11	0.17	0.13	0.07	0.23	0.08	1	-	-	-	-
K	0.04	0.08	0.06	0.13	-0.05	-0.06	-0.06	0.34	-0.07	0.55	1	-	-	-
L	0.04	0.07	0.07	0.14	-0.05	0.09	0.21	0.2	0.08	0.26	0.23	1	-	-
M	0.03	0.08	0.09	-0.01	-0.01	-0.04	0.06	0.2	-0.06	0.09	0.19	0.54	1	-
N	0.04	-0.09	-0.09	-0.01	-0.01	0.01	0.06	0.21	-0.06	0.13	0.33	0.48	0.69	1

Significant Associations are typed in bold

**A-Inadequate vigorous exercise; B-Inadequate strengthening exercise; C-Inadequate moderate exercise; D-High–level sedentary behavior; E-Insufficient fruit & vegetable consumption; F-Fast-food consumption; G- Breakfast skipping; H-Soda consumption; I-Diet-soda consumption; J-Energy Drinks consumption; K-Current cigarette smoking; L-Current water pipe smoking; M-Current E-cigarette smoking; N-Current E-water pipe smoking.

Table 2: Phi coefficient (φ) of association the Unhealthy lifestyles (n=428).

there is a decline in interest in energy drinks in SA.

The third objective of the study was to describe the prevalence of tobacco use. Only 6.2% of the students were current cigarette smokers, and only 4.2% of them were current water pipe smokers. Furthermore, the use of e-cigarettes and e-water pipe products was very low (0.93% and 1.9%, respectively). Our results showed lower rates of tobacco use than those previously reported for other Saudi university students [16-18]. This finding may support the assumption that smoking rates have been decreasing in SA for the last decade. However, there is a need for the national data to support this assumption [18].

The fourth objective was to assess gender differences in the prevalence of the above mentioned risk-behaviors. The results showed that there were only few significant gender differences. Specifically, males were more likely to consume fast-food and cola than females. The finding that males consume more fast-food is inconsistent with a previous study among Tabuk University students. That study found that females consumed more fast-food than males [34]. There may be an inter-regional variation, especially because this issue is understudied.

The last objective was to examine whether the targeted risk behaviors were clustered among the students. The results of Phi-coefficient (φ) for associations showed minimal significant level of associations between risk behaviors. Our findings are inconsistent with the findings that support clustering of lifestyle risk factors [20,21]. Our results may be attributed to the high variability of the prevalence of targeted risk behaviors among the participants.

Strengths and Limitations

Our study has some limitations. The results of the study were based on participants' self-reporting. This approach has some drawbacks. Compared with other assessment methods that depend on respondents' memory, our results are subject to recall bias [35]. Moreover, the results are subject to social desirability bias. Second, there is a possibility of under-reporting of smoking behaviors, particularly among females, because biochemical verification of smoking behavior was not performed. To minimize these biases, considerable efforts were made to ensure confidentiality and privacy of the students, which was believed to enhance the reliability of the self-reporting method [36]. Another limitation is the extent to which the findings can be generalized. Because the study included only medical students, the results may not be generalized to all student population. The last limitation is the large discrepancy in the literature about the acceptable amounts of intake of fast-food, soda, and energy drinks for healthy adult individuals. Thus, national standardization is needed to facilitate comparison between country wide studies and to obtain ecological profiles for the kingdom. In spite of these potential limitations, the study has considerable strength. It is one of the first to investigate multiple risk behaviors in this population. The included variables are very important in the development of chronic diseases.

Practical Implications

The findings of this study make several implications. First, there is a necessity in behavior change interventions to manage the spreading of unhealthy lifestyles, particularly physical inactivity, among our target group. Medical curriculum should reinforce the adoption of healthy behaviors by medical students, especially because medical students serve as role models for the other students. Moreover, the transition from being a medical student to being a good doctor requires committed role models. Hence, university-based health education and promotion programs are required. Such programs will require data about the psychosocial determinants of each unhealthy behavior. This requires additional, preferably longitudinal, research. Nevertheless, it is recommended to conduct broader studies that encompass students from different areas at the university so that the results could be generalized to the entire student population.

Conclusion

This study has shown various prevalence rates of unhealthy lifestyles among medical students at Qassim University. These behaviors range from the widely prevalent physical inactivity to the uncommon tobacco smoking. Therefore, physical inactivity with different intensity categories should be addressed as the highest priority, followed by the insufficient consumption of fruits and vegetables, and the high consumption of fast-food. In general, promotion of healthier lifestyle choices among medical students early in their medical education will help them as they progress from being undergraduate students to being young doctors. A new generation of doctors should be well educated to improve health and to provide lifestyle education to their patients.

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