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Prevalence of non-communicable diseases risk factors among first year medical college students at King Saud Bin Abdulaziz University for health sciences, Jeddah

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ABSTRACT

Objective: To determine the prevalence of NCD risk factors among first-year medical college students at Jeddah's King Saud Bin Abdulaziz University for Health Sciences (KSAU-HS). Duration of the study**:** The study was completed in 8 months in 2021 (started from submitting the proposal in January, 2021). *Methods:* WHO STEP-wise approach to Surveillance (STEPS) of NCD risk factors was used, which includes three steps for assessing the risk factors: 1) Questionnaire 2) objective physical measurements 3) biochemical measurements. The estimated minimum sample size was calculated using the software Raosoft website, which were 227. To analyze the data, SPSS version 27.0 was used. *Results:* A total of (232) first-year medical students took part in the study. Data on sociodemographic factors, diet, salt intake, smoking, physical activity, and illness conditions were collected using a structured questionnaire. *Conclusion:* Results of the present study showed a high prevalence of NCDs risk factors among the participants. The study shows the importance to bring change in medical students' lifestyles to avoid the onset of NCDs later in life. Colleges need to assist students and intervene to lower these risk factors. Programs that promote healthy lifestyle and awareness are particularly essential for high school and college students. In all of schools and colleges in KSA, students should have access to sports and fitness facilities along with appropriate counseling and periodic screenings of students.

Keywords: Jeddah, Non-Communicable Diseases, Nutrition education, Sociodemographic variables.

1. INTRODUCTION

Cardiovascular illnesses, strokes, diabetes, malignancies, and chronic respiratory disorders are examples of non-communicable diseases (NCDs), which are also known as chronic diseases (WHO, 2013). NCDs account for

over 71 % of all deaths globally, according to the World Health Organization (WHO), and they place a significant burden on individuals, governments, and society (WHO, 2013; WHO, 2015). NCDs cause premature deaths, shortened life expectancies, severe disabilities, low productivity, and poverty on an individual level due to the ongoing need to pay for drugs and the inability to work for an extended amount of time (WHO, 2015). On a legislative level, NCDs can stifle a country's economy and growth by putting a strain on both its health-care systems and its resources. Finally, they have unfavorable socioeconomic effects on a society level (WHO, 2015). Furthermore, over the last three decades, the Kingdom of Saudi Arabia (KSA) has seen a drop in communicable diseases with an increase in NCDs. According to the Ministry of Health (MOH) in KSA, NCD treatment accounts for 65 % of health-care spending. Furthermore, the Saudi MOH is working tirelessly to lower the prevalence of NCDs by establishing health strategies and programs as part of the country's overall development strategy (Rahamathulla and Mohemmed, 2020). NCDs have also been included in the United Nations 2030 Agenda for Sustainable Development, which aims to reduce the number of premature deaths caused by NCDs by a third by 2030 (WHO, 2020; Alzahrani et al., 2019; Martinez-Lacoba et al., 2018). Transitioning from youth to adulthood or to a higher educational level is considered a big life change since it has a substantial impact on adapting unhealthy health habits and unwanted weight gain, which can increase the risk of NCDs (Olatona et al., 2018). As a result, introducing positive health-related behaviors and detecting hazards at a young age will have a significant impact on the adaptation of healthy behaviors that will last throughout adulthood (WHO, 2020; Alzahrani et al., 2019).

Numerous risk factors for NCDs have been identified among medical college students, according to various researches. A self-reported questionnaire was used in one study in Riyadh to assess health factors related to cardiovascular risks in university students (Mishra et al., 2015; Goswami et al., 2018; Yasmin et al., 2019; Desouky et al., 2018; Mansour et al., 2020; Phaswana-Mafuya et al., 2013). They came to the conclusion that college students require obesity and related illness prevention programs (Abdel-Megeid et al., 2011). Another study in Wadi Al Dawaser used two surveys and included female students from various majors: 1) NCD Surveillance Toolkit from the Pan American Health Organization (PAHO) 2) STEP-wise approach-to-Surveillance (STEPS) of NCD risk factors questionnaire developed by the WHO. In addition to 100% reports of junk food consumption, the survey found a high frequency of physical inactivity (Rahamathulla and Mohemmed, 2020). Only two studies on medical students have been carried out in KSA to our knowledge.

Despite their understanding of the need of healthy eating habits, one revealed a high incidence of NCD risk factors, while the other demonstrated no improvements in students' health-related behavior (Desouky et al., 2018; Alissa et al., 2015). Having said that, it is apparent that despite their enhanced knowledge of health and medicine, many medical students in various parts of the world, including KSA, have been engaged in harmful health habits (Alzahrani et al., 2019). Additionally, only a few studies focusing on the frequency and risk factors of NCDs among medical students in KSA were discovered during the literature review (Rahamathulla and Mohemmed, 2020). As a result, public data on the prevalence and risk factors of NCDs among college students in KSA will be expanded as a result of this research. Our goal was to determine the major risk factors for NCDs among first-year college students at the King Saud Bin Abdulaziz University for Health Sciences (KSAU-HS) in Jeddah, KSA.

2. MATERIALS AND METHODS

Design

WHO STEP-wise approach to Surveillance (STEPS) of NCD risk factors was used, which includes three steps for assessing the risk factors: 1) Questionnaire 2) objective physical measurements 3) biochemical measurements. Items which required adaptation to the local environment were adapted in accordance with the guidelines.

Study population

The population of 1st year college students at KSAU-HS, Jeddah, 2021

Inclusion criteria

First year medical students at KSAU-HS, Jeddah, 2021

Exclusion criteria

Any medical student not from KSAU-HS, Jeddah, Students with incomplete data, Students who refuse the consent.

The sample size was calculated using software Raosoft by the website http://www.raosoft.com/samplesize. During the year of 2019, the total number of population was 550 students. The required sample size was estimated with a margin of error of 5% at a confidence level of 95% and an estimated 50% response distribution. The estimated minimum sample size is 227.

Data Collection

Step (1): Questionnaire Information collected, after obtaining participants' consent, using an electronic survey form. The survey was sent to all 1st year college students' university email. The form contained different sections including, participation consent, demographic information (gender, age, educational level, marital status), behavioral measurements (smoking, diet, physical activity) and medical history (raised blood pressure, diabetes, cholesterol level, cardiovascular disease, and lifestyle advice). Step (2 & 3): Physical and biochemical measurements, which was collected from BESTCare Health Information System. The data was obtained during the students' first medical check-up before entering university.

Measurements

BMI, blood pressure, lab results (blood glucose, lipid profile, and urinary sodium and creatinine). Completed data were sorted and coded using an Excel sheet in a secured computer.

Statistical analysis

SPSS, version 27.0 was used to analyze the data. All continuous variables were not normally distributed, for which the median and interquartile range (IQR) were used for summarization. Categorical variables were presented in tables as frequencies and percentages. The study was conducted after obtaining the IRB approval from King Abdulaziz International Medical Research Center (KAIMRC). All personal information was kept anonymous and safe. Only the investigators of this study had access to the file.

3. RESULTS

The total number of participants was 232 first year medical students. The age ranged from 18 to 25 with a median of and quartiles of 20. Other sociodemographic characteristics are shown in (Table 1).

Table 1 The sociodemographic characteristics of the sample.

Variable	Frequency (N: 232)	Percentages (%)
Gender		
Male	89	38.4%
Female	143	61.6%
Marital status		
Single	230	99.1%
Married	2	0.9%
Number of individuals living at home		
Less than 6	171	73.7%
6-9	55	23.7%
More than 9	6	2.6%
Earnings of household/month		
5,000 or less	30	12.9%
5,001-9,999	48	20.7%
10,000 or more	154	66.4%

The physical activity and dietary habits of the students are shown in (Table 2). More than half of the students 138 (59.5%) reported to be physically active, while 94(40.5%) reported to be physically inactive. However, of those physically active students, only 22 (15.9%) noted to exercise more than four times a week for a period of 30 minutes on average, which is the recommended practice according to WHO (WHO, 2005).

The daily fruits consumption among students was significantly high, with a frequency of 185 (79.7%). However, only 3 (1.6%) of them were consuming the daily fruit recommended >4 per day (WHO, 2005). Similarly, 216 (93.1%) students reported to consume vegetables every day, yet only 14 (6.5%) reported to consume the recommended number of vegetables per day (WHO, 2005). The majority 198 (85.4%) reported additional salt consumption whereas 24 (10.3%) students do not add salts, and 10 (4.3%) students don't take note to their salt intake. 24 (10.3%) students are current smokers, while those who have never smoked represent 208 (89.7%).

Table 2 The physical activity and dietary habits of the sample.

Variable	Frequency	Percentages (%)
Weekly physical activity: (N: 232)		
Yes	138	59.5%
No	94	40.5%
Frequency of physical activity (30 minutes) / week (N: 138)		
1-2/week	73	52.9%
3-4/week	43	31.2%
>4/week	22	15.9%
Daily fruit consumption(N: 232)		
Yes	185	79.7%
No	47	20.3%
Fruit intake, serving per day (N: 185)		
1-2/day	172	93%
3-4/day	10	5.4%
5-6/day	3	1.6%
Daily Vegetable Consumption(N: 232)		
Yes	216	93.1%
No	16	6.9%
Vegetable intake, serving per day **(**N: 216**)**		
1-2/day	183	84.7%
3-4/day	19	8.8%
5-6/day	14	6.5%
Salt Consumption		
Yes	198	85.4%
No	24	10.3%
I don't know	10	4.3%
Cigarette Smoking:		
Yes	24	10.3%
No	208	89.7%

The biochemical parameters of the participants are shown in (Table 3). The median for body mass index was 22.7 and IQR (19.2-27.7). Out of the 232 students, 102 (44%) had normal BMI and 130 (56%) had abnormal BMI. More details regarding BMI are shown in (Figure 1), 48 (20.7%) were underweight, 40 (17%) were overweight, and 42 (18%) had a BMI of 30kg/m2 or higher. Results analysis of the BP values showed that 180 (77.6%) had systolic elevated BP and 64 (27.6%) had diastolic elevated BP. Random blood glucose level analysis reported 158 (68.1%) students with normal values and 74 (31.9%) students with abnormal values (Table 3).

Table 3 The biochemical parameters of the participants.

Variable	Frequency (N: 232)	Percentages (%)
Body Mass Index (Kg/m^2)		
Normal (18.5 - 24.9)	102	44%

Abnormal BMI (<18.5or ≥25)	130	56%
Systolic Blood Pressure (mmHg)		
Normal (<120)	52	22.4%
Elevated BP (≥120)	180	77.6%
Diastolic Blood Pressure (mmHg)		
Normal (<80)	168	72.4%
Elevated BP (≥80)	64	27.6%
Random blood glucose (mmol/l)		
Normal (3.9 - 5.6)	158	68.1%
Abnormal (>5.6)	74	31.9%
Cholesterol (mmol/l)		
Normal (<5.18)	201	86.6%
Abnormal (≥5.18)	31	13.4%

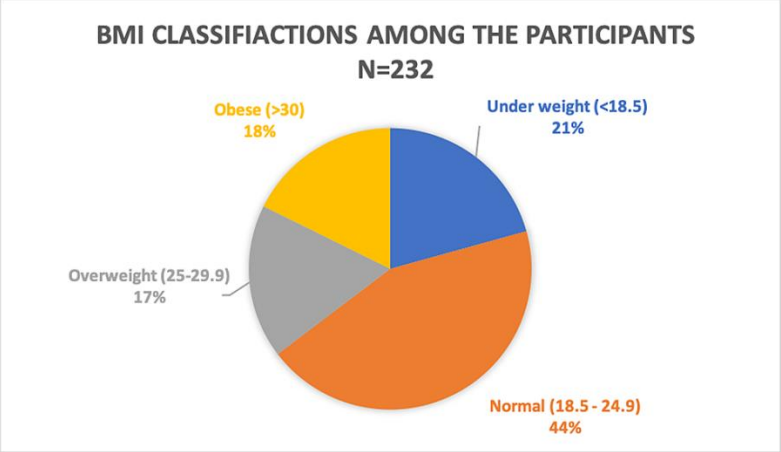

Figure 1 BMI classification among the participants.

4. DISCUSSION

This study was conducted to identify risk factors of NCDs among medical students. NCDs are becoming more common around the world, posing a significant public health threat. In KSA, there has been a drop in communicable diseases but an increase in NCDs over the last three decades (Alissa et al., 2015). The findings of the study agree with the results in some other studies that show a significant increase of NCD risk factors among university students, especially medical students. Regarding the incidence of physical activity, our study found that more than half of medical students 116 (84.1%) are not doing daily regular exercise (>4/weeks). This result is similar to a study that was done at Uniazah College of Medicine. It was found that 185 (66.7%) out of 507 medical students at Uniazah College of Medicine are not doing daily exercise (Mansour et al., 2020). Also, another study done at King Abdulaziz University that included 200 medical students showed that 184 (93%) of them were not doing daily regular exercise (Alissa et al., 2015). This may be due to the campus' sports department's improper operation.

The sports wing of universities must play a substantial role in promoting and facilitating sports in colleges to expand the number of people who engage in regular exercise. Also, it would be beneficial to start relaying on stairs instead of elevators in universities. Moreover, Unhealthy diet is another risk factor for developing NCDs, and our study established that 20.3% of medical students do not consume fruits on a daily basis and 6.9% of them do not consume vegetables as well. Similarly, there is a study showed that 24.7% of medical students never eat fruit on a daily basis, and 18.6% of them do not also eat vegetables (Mansour et al.,

2020). Furthermore, obesity is considered as one of the most important risk factors. After analyzing our results, we found obese medical students who are more than or equal to 30kg/m2 make up 18% of the total percentage. This is in concordance with another study conducted in Kolkata showed that 22 medical students (13.3%) out of 166 medical students are obese and another one conducted in Taif University showed that 41 medical students (18.1%) out of 227 of medical students are obese (Goswami et al., 2018; Desouky et al., 2018). However, we found that overweight (25-29.9 kg/m2) students make up 17.7% of our total results, which is lesser than other studies (Goswami et al., 2018; Yasmin et al., 2019; Desouky et al., 2018). The kids' bad eating habits are to blame for their excessive waist circumference and obesity rates. Also, university students rely heavily on the college cafeteria for breakfast or lunch, where all of the options are not healthy, leaving them with no alternatives.

Additionally, 180 (77.6%) of our medical students had elevated systolic BP (SBP≥120) and 64 (27.6%) of them were having elevated diastolic BP. Which is comparatively higher than other studies that had 4.2% - 11.4% of their students with high blood pressure (Goswami et al., 2018; Yasmin et al., 2019; Desouky et al., 2018). Regarding cholesterol, there is a study conducted in a medical college West Bengal found 18.1% of medical student have high cholesterol level. Similarly, our study showed that 13.4% of our students have high cholesterol level (Yasmin et al., 2019). In our research population, 21.1% frequently add salt to food, 10.3% always eat processed high-fat foods, and 18.1% consume too much salt. Therefore, providing various options of healthy food and vending machines for health snacks in medical universities that can fit different preferences of the students can have a major contribution in decreasing NCDs.

In addition, smoking is considered as another significant risk that increases the development of NCDs. Although due to cultural factors we were suspecting less than 5% of medical students who smoke, yet we found that 10.3% are smokers. This result agrees with another study which reported 15.1% of medical students being smokers (Mansour et al., 2020). Also, a similar result of a cross-sectional study that was done among medical student at a university in Jeddah showed 23 (9.5%) out of 243 of medical students are currently smokers. For that reason, encouraging medical students to start visiting smoking cessation clinics and giving lectures about the harms of smoking to the students will have a positive effect on decreasing preventing smoking habits. Also, reducing stress by booking regular appointments for medical students in the well health clinic since stress is the major contributor of smoking.

Despite the knowledge of medical students about NCDs and their risk factors, the proportion of students engaging in bad habits is high. This research revealed that, regardless of awareness, bad habits that have a major contribution to NCDs can be present in medical students due to various reasons including stress, unhealthy food options, no time for regular exercise, long hours of studying facing them throughout the years of medical school. As it is part of the overall national development framework, these risk factors disorders were given significant priority in the KSA's health plans and goals for NCDs prevention (MOH, 2013). A high prevalence of risk factors for NCDs, such as lack of physical activity, sedentary lifestyle, and bad food habits, was discovered among university students in this study, signaling the need for intervention.

Medical schools must be aware of these reasons and put great efforts in reducing lifestyle-related disease by providing a healthier environment for medical school since most of their time is spent in college by implementing educational curriculum about healthy lifestyle, curriculum should focus on the importance of adoption of healthy lifestyles in this young age to avoid the occurrence of NCDs in adulthood, implementing awareness programs for NCDs risk factors to medical students especially 1st year, providing healthy food/snacks for students instead of carbonated drinks and junk food and encourage them by giving gifts/extra free meal for next time, encouraging students to use stairs and using elevators only for emergent cases, encouraging students to go to gym and make some classes and open it on weekend, encouraging students to track their daily steps and support who having highest steps, providing annual checkups for students with high risk, and providing periodic screening of the students at regular intervals is required for our future doctors. The burden will increase in the future if current behaviors are not changed in medical students, who are considered future role models in the community.

Limitations of the study

The study's strength is that it primarily focused on the urban population, which is often overlooked in research studies. The findings of this study will increase the public data available in KSA, regarding the risk factors of NCDs in medical students. College students' health behaviors are important as they make up a large part of KSA youth population and these behaviors are a crucial factor in determining an individual's risk of developing NCDs later in life. More studies like this are needed at various regional levels to gain more understanding of the current situation in KSA.

5. CONCLUSION AND RECOMMENDATIONS

In conclusion, the study's aim was to establish the prevalence of risk factors of NCDs among first year medical students. Based on the findings of this study, the participants had a high prevalence of some of these risk factors. The study shows importance to bring change in medical students' lifestyle. To avoid the onset of NCDs later in life, it is critical to adapt healthy lifestyle practices at a young age. University should help students and do some interventions to reduce these risk factors. Healthy lifestyle education and awareness programs are especially important for first-year medical students. Also, the university should encourage medical students to go to the gym. Periodic screening of students at regular intervals is also required, along with relevant counseling.

Authors' Contributions

All authors revised the manuscript critically and gave final approval to submission of the manuscript. Asmaa Alrefaie: Conceptualization, Supervision, and Validation. Nourah Alageel, Eiman Saleh, Tahani Asiri, Rafeef Jarwan, and Roaa Bakraa: Data curation, Writing- Original draft preparation.

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Informed consent

Written & Oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

Ethical approval

The study was approved by King Abdullah International Medical Research Center (KAIMC) issued approval NRJ21J/009/01.

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Conflict of interest

The authors declare that there is no conflict of interests

Data and materials availability

All data associated with this study are present in the paper.

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