Original Article

The lifestyle of Saudi medical students

Khalid Bin Abdulrahman [1*]**, Ahmad M. Khalaf** [2]**, Fahad B. Bin Abbas**[3] **and Omran T. Alanazi** [4]

[1]   Imam Mohammad Ibn Saud Islamic University (IMSIU), Riyadh, Saudi Arabia 1; kab@imamu.edu.sa
[2]   Imam Mohammad Ibn Saud Islamic University (IMSIU), Riyadh, Saudi Arabia 2; ahmad_khalaf@live.com
[3]   Imam Mohammad Ibn Saud Islamic University (IMSIU), Riyadh, Saudi Arabia 3; imsiufahad@gmail.com
[4]   Imam Mohammad Ibn Saud Islamic University (IMSIU), Riyadh, Saudi Arabia 4; Om1005@hotmail.com

*   Correspondence: kab@imamu.edu.sa; Tel.: +966505445384

Abstract: This study was conducted to investigate medical students' lifestyle habits, including sleep quality, eating and drinking pattern, physical activity, and social status. **Method**: This research project is part two of a multi-institutional cross-sectional observational study conducted among medical students from six medical colleges in Saudi Arabia between September and December 2019. **Results**: 675 medical students were enrolled electively into the lifestyle study. About half of this number were male students, and the majority aged 18-24 years. Most students (87.6%) slept between 4-8 hours a day, and over 44% were dissatisfied with their sleep. Only 28.1% had three meals a day; about 40% of them usually or always skipped breakfast. While 44% usually or always eat fast food, 44.7% drink 2 liters of water per day. Moreover, male students were significantly consuming fast foods than females, p<0.001. The majority (63.3%) revealed they usually or always drink black coffee daily. Females were significantly more inclined to regular coffee consumption than males, p<0.001. Only 4.3% exercising for 30 minutes or more daily. The majority (65%) of the students were introverted; they had few close friends. Yet, 81% were somewhat satisfied or satisfied with their social life. Male students were predicted to be significantly more satisfied with their social life than females, p=0.001. Only 4.6% smoked cigarettes daily. Whereas 7.1% smoke e-cigarette daily. In contrast, only 0.3% use shisha (hookah) daily. Male medical students were substantially more predicted to be inclined to e-cigarette use than females (p <0.001. The top five leisure activities of a medical student are surfing social media (75.9%), watching movies (61.3%), hanging out with friends (58.1%), spent time with their family (55.4%), and browsing the internet (53.6%). Female medical students were significantly more inclined to surfing social media than male medical students, p=0.022; also, watching movies was preferred for females compared to males, p=0.006. **Conclusion:** This study revealed that the majority of medical students in Saudi Arabia exhibited healthy lifestyles to some extent, and these health-promoting behaviors differed based on gender, especially concerning physical activity and eating patterns. The findings of this study provide relevant information for future actions that will be geared towards effectively decreasing the occurrence of chronic illnesses and improving future doctor's well-being.

Keywords: Saudi Arabia 1; Lifestyles 2; Medical students 3; Medical education 4

1. Introduction

Lifestyle habits are important indicators of future well-being, productivity, and life expectancy. Since doctors represent a unique and remarkable human resource within a nation, improving and safeguarding physicians' health through lifestyle modification is a health preservation strategy that is beneficial to society. Conservation of doctors' health and well-being should begin when they start their training in medical school. Most healthy lifestyle habits are cultivated early, challenging to change, and retained throughout life; the earlier such an action begins, the more compelling it will be.[1] It is usually a common perception that medical students have better information about healthy lifestyle habits when compared to non-medical students. However, there is no proof whatsoever to show that this information translates into preserving excellent well-being practices.[2] Lifestyle habits among medical students could be determined by worries, just as stress could affect students' academic accomplishments. Propensities in any group of

individuals will culminate in a positive outcome: healthy habits, or contrarily, prompting lifestyle disorders.[3] A sedentary lifestyle has precipitated an increase in the prevalence of dyslipidemia, obesity, and cardiovascular diseases.[4] Almost all Saudi medical colleges have developed their curricula. The majority have adopted the new trends in teaching and learning that focus on active learning, problem-based learning, vertical and horizontal integration, and community-based oriented education.[5–8] There are many publications on lifestyle habits among university students. However, in Saudi Arabia (KSA), there are scarcely any investigations depicting medical students' knowledge and their view of healthy lifestyle habits.[9] Consequently, in this study, we made concerted efforts to gather information on the most highly effective lifestyle habits among medical students in various medical schools in KSA, hopefully assisting future medical students throughout their academic years and social lives.

2. Materials and Methods

Study design: This research project is part two of a multi-institutional cross-sectional observational study conducted among medical students at various medical colleges in Saudi Arabia.

Participants and sampling: All medical students of either gender of the pre-clinical and clinical years were invited by email through the vice-dean of academic affairs of the six medical colleges in Saudi Arabia. Two reminder email and SMS web links messages were sent to enhance the response rate. The data was collected from the responded medical students in the six medical colleges, namely Imam Mohammad Ibn Saud Islamic University (IMSIU), King Abdulaziz University, King Saud Bin Abdulaziz University for Health Sciences (KSAU-HS), Qassim University, Alfaisal University, and King Saud University.

Study questionnaire: The questionnaire was designed to study medical students' lifestyle habits, including sleep quality, eating and drinking routine, physical activity, social status and leisure activities. The students were informed about the purpose of the study. Instructions regarding the questionnaires were provided to volunteering students. The confidentiality of information was also ensured. Once students voluntarily signed the informed consent, they were requested to fill the study questionnaires. The questionnaire was adapted from different resources and manuscripts, which made it suitable for our study. The questionnaire was subjected to piloting testing by 25 students; some questions were modified accordingly. All students were emailed to participate and been reminded by emails and via an SMS web link. The Institute Review Board at Imam Mohammad Ibn Saud Islamic University had approved the study and it was according to the declaration of Helsinki.

Statistical data analysis: Data were entered and analyzed using IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp. Categorical data were presented as counts and percentages, and numerical data presented as mean (± SD). A Chi-square test was used to assess the association between medical student' characteristics and gender. A test with a p-value less than 0.05 was considered statistically significant.

3. Results

Six hundred and seventy-five medical students were enrolled in the lifestyle study. They were participating from six medical schools in different Saudi universities. Table 1 summarizes the sociodemographic and academic characteristics of the study population.

Table 1: The medical students' sociodemographic and academic characteristics. N=675

Variables		Frequency	Percentage
Gender	Female	301	44.6

	Male	374	55.4
Age	18-24	614	91
	25-34	61	9
Marital status	Single	654	96.9
	Married	61	3.1
Place of residency	Student's dormitory	24	3.6
	Family resident	619	91.7
	Privately rented house	32	4.7
College of medicine	IMSIU	131	19.4
	Alfaisal University	143	21.2
	King Abdulaziz University	110	16.3
	KSAU-HS		
	King Saud University	108	16
	Qassim University	69	10.2
		114	16.9
Level of education	1st year	150	22.2
	2nd year	121	17.9
	3rd year	118	17.5
	4th year	90	13.3
	5th year	136	20.1
	Internship year	60	8.9
Level of study	Pre-clinical phase (years 1-3)	271	40.1
	Clinical phase (years 4-6)		
		404	59.9
Academic GPA	<4 out of 5	196	29
	≥4 out of 5	479	71

Table 2 showed the sleeping, eating, drinking, and exercising habits of medical students. Most students (87.6%) slept between 4-8 hours a day. Over 44% were dissatisfied with their sleep. However, 18.4% were happy with their sleep. Furthermore, 17.6% found it difficult or very difficult to fall asleep. Only 28.1% had three meals a day. About 40% of them usually or always skipped breakfast. While 44% usually or always eat fast food. Moreover, 44.7% drink 2 liters of water per day.

Table 2: The descriptive analysis of the medical students' sleep, dietary, and exercise habits N=675

Variables		Frequency	Percentage
Daily sleep per hour	<4 Hours	24	3.6
	4-6 Hours	311	46.1
	6-8 Hours	280	41.5
	>8 Hours	60	8.9

Sleep satisfaction the previous month	Very dissatisfied	75	11.1
	Dissatisfied	226	33.5
	Neither	205	30.4
	Satisfied	124	18.4
	Very satisfied	45	6.7
Falling asleep easily over the previous month	Very difficult	27	4
	Difficult	92	13.6
	Neutral	193	28.6
	Easy	232	34.4
	Very easy	131	19.4
Daily meals	Breakfast and dinner	82	12.1
	Breakfast and lunch	124	18.4
	Breakfast only	7	1
	Breakfast, lunch, and dinner		
	Dinner only	190	28.1
	Lunch and dinner	28	4.1
	Lunch only	190	28.1
		54	8
Fast food consumption	Never	8	1.2
	Rarely	107	15.9
	Sometimes	260	38.5
	Usually	216	32
	Always	84	12.4
Daily drinking of 2 liters of water	Never	23	3.4
	Rarely	153	22.7
	Sometimes	197	29.2
	Usually	169	25
	Always	133	19.7
Skipping breakfast	Never	93	13.8
	Rarely	158	23.4
	Sometimes	155	23
	Usually	152	22.5
	Always	117	17.3
Drinking coffee per day	Never	58	8.6
	Rarely	82	12.1
	Sometimes	108	16
	Usually	108	16
	Always	319	47.3
Exercising ≥30 minutes	Never	113	16.7
	Very rarely	168	24.9
	Once per Month	38	5.6
	Few times per month	81	12
	About once a week	58	8.6

	A few times per week		
	Five days a week	131	19.4
	Daily	57	8.4
		29	4.3

       Table 3 displays the descriptive analysis of the medical students' social activities and smoking habits. The majority (65%) of the students were introverted, they were enjoying being isolated, or they had few close friends only. And 81% somewhat satisfied or satisfied with their social life. Only 4.6% smoked cigarettes daily. Whereas 7.1% smoke e-cigarette daily. In contrast, only 0.3% use shisha (hookah) daily.

Table 3: The descriptive analysis of the medical students' social activity and smoking habits N=675

Variables		Frequency	Percentage
Social status	Introvert	439	65
	Extrovert	236	35
Satisfied/Happy with social life	Not satisfied	127	18.8
	Somewhat satisfied	295	43.7
	Satisfied	253	37.5
Cigarette smoking	Never	586	86.8
	Rarely	40	5.9
	Once per week	7	1
	Few times per week	11	1.6
	Daily	31	4.6
Electronic cigarette	Never	582	86.2
	Rarely	26	3.9
	Once per week	4	0.6
	Few times per week	15	2.2
	Daily	48	7.1
Shisha smoking	Never	583	86.4
	Rarely	77	11.4
	Once per week	11	1.6
	Few times per week	2	0.3
	Daily	2	0.3

       Table 4 showed the bivariate analysis of lifestyle characteristics across gender. The daily eating habits differed significantly between male and female medical students, p<0.001. Moreover, male students were significantly more inclined to consuming fast foods than females, p<0.001. The majority (63.3%) revealed they usually or always drink black coffee daily. Females were significantly more inclined to regular coffee consumption than males, p<0.001. Surprisingly, only 4.3% exercising for 30 minutes or more daily. Male students were predicted to be significantly more satisfied with their social life than females, p=0.001. Male medical students were significantly more inclined to daily smoking than female medical students, p=0.001 according to a likelihood ratio adjusted chi-squared test. Additionally, male medical students were substantially more predicted to be inclined to e-cigarette use than females (p <0.001.

Table-4: Bivariate analysis of lifestyle characteristics across gender. N=675

Variables		Students gender Frequency (Percentage)			
		Female	Male	test statistic	p-value
Level of Study	Pre-Clinical phase(years 1-3)	145 (48.2)	126 (33.7)	$\chi2(1)=14.64$	<0.001
	Clinical phase (4th-6th years)	156 (51.8)	248 (66.3)		
Meals daily	Breakfast and dinner	36 (12)	46 (12.3)	$\chi2(6)=51.64$	<0.001
	Breakfast and lunch	83 (27.6)	41 (11)		
	Breakfast only	6 (2)	1 (0.3)		
	Breakfast, lunch, and dinner	71 (23.6)	119 (31.8)		
	Dinner only	14 (4.7)	14 (3.7)		
	Lunch and dinner	60 (19.9)	130 (34.8)		
	Lunch only	31 (10.3)	23 (6.1)		
Fast food consumption	Never	6 (2)	2 (0.5)	$\chi2(4)=23.4$ LR	<0.001
	Rarely	57 (18.9)	50 (13.4)		
	Sometimes	125 (41.5)	135 (26.1)		
	Usually	93 (30.9)	123 (32.9)		
	Always	20 (6.6)	64 (17.1)		
Daily drinking 2 liters of water	Never	17 (5.6)	6 (1.6)	$\chi2(4)=45.61$	<0.001
	Rarely	93 (30.9)	60 (16)		
	Sometimes	95 (31.6)	102 (27.3)		
	Usually	56 (18.6)	113 (30.2)		
	Always	40 (13.3)	93 (24.9)		
Coffee consumption per day	Never	20 (6.6)	38 (10.2)	$\chi2(4)=21.45$	<0.001
	Rarely	31 (10.3)	51 (13.6)		
	Sometimes	39 (13.0)	69 (18.4)		
	Usually	39 (13.0)	69 (18.4)		
	Always	172 (57.1)	147 (39.3)		
Satisfied/Happy with social life	Not satisfied	71 (23.6)	56 (15)	$\chi2(2)=14.08$	0.001
	Somewhat satisfied	138 (45.8)	157 (42.0)		
	Satisfied	92 (30.6)	161 (43.0)		
Cigarette Smoking	Never	276 (91.7)	310 (82.9)	$\chi2(4)=17.58$ LR	0.001
	Rarely	16 (5.3)	24 (6.4)		
	Once per week	1 (0.3)	6 (1.6)		
	Few times per week	3 (1.0)	8 (2.1)		
	Daily	5 (1.7)	26 (7.0)		
Electronic Cigarettes	Never	276 (91.7)	306 (81.8)	$\chi2(4)=26.75$ LR	<0.001
	Rarely	13 (4.3)	13 (3.5)		
	Once per week	1 (0.3)	3 (0.8)		

| | Few times per week | 5 (1.7) | 10 (2.7) | | |
| | Daily | 6 (2.0) | 42 (11.2) | | |

The top five leisure activities of a medical student are listed in figure 1. These are surfing social media (75.9%), watching movies (61.3%), hanging out with friends (58.1%),   spent time with their family (55.4%), and browsing the internet (53.6%). Female medical students were significantly more inclined to surfing social media than male medical students, p=0.022; also, watching movies was preferred for females compared to males, p=0.006 according to the chi-squared test of association.

Figure 1: The top five leisure activities of medical student
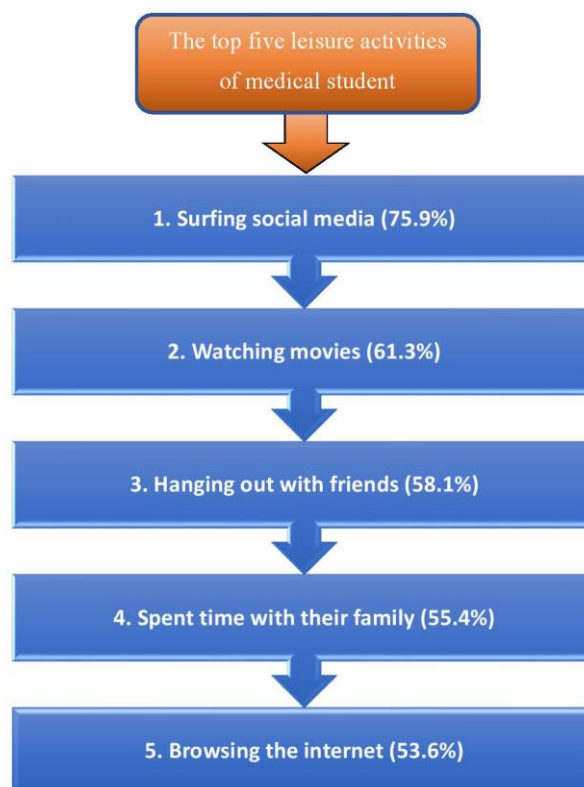
4. Discussion

Authors should discuss the results and how they can be interpreted from the perspective of previous studies and of the working hypotheses. The findings and their implications should be discussed in the broadest context possible. Future research directions may also be highlighted.

College life is a conceivably important objective for the endorsement of a youthful adult populace's healthy lifestyle. The gender-specific distinction was perceived in terms of the students' nutritional and lifestyle knowledge and attitude, as shown in previous studies, which reported that female students accomplished better scores than male

students on nutritional knowledge and perspective.[10]   There was no much difference in hours slept per day between the two genders; 49.2% of the female students slept 4-6 hours daily compared to 43.6% of the male students. Also, those who slept 6-8 hours per day among the females were 37.9% compared to 44.4% among the males (p=0.258). Regarding sleep satisfaction, only a small percentage were satisfied in the female group (15.3%) and the male group (20.9%) (p=0.103). Most of the students had no problems falling asleep at night (p=0.182). Another similar study conducted on medical students showed that the average sleep duration was 6-8 hours.[11] In 2002, the National Sleep Foundation poll revealed that Americans' average sleep duration was 6.9 hours per week-night,[12] which was considered a positive habit. For the nutritional status, female students who had breakfast, lunch, and dinner were 23.6%, while in the male group, the percentage was 31.8%. However, the number of female students who had lunch and dinner was 19.9% compared to 34.8% for male students. Also, female students had a higher percentage for breakfast and lunch only (27.5%) compared to 11% for the males (p=<0.001). Regarding fast food consumption, both groups had similar percentage values since the majority of both genders chose the options "sometimes" and "usually" (p=<0.001). However, this does not pertain to the daily consumption of 2 liters of water since 30.9% of females rarely drank 2 liters of water than 16% of males. Furthermore, 18.6% of the female students usually drink 2 liters of water than 30.2% of male students (p=<0.001). Interestingly, only a small percentage of both groups always skip breakfast (p=0.528). These results are comparable to a study conducted on Chinese medical students. The outcomes showed that most students (83.6%) reported taking meals regularly, with 79.0% eating meals three times daily. There were no differences in terms of gender. However, a noteworthy gender difference was observed in response to questions bordering on how often they had breakfast. 66.8% of males and 82.3% of females reported having breakfast regularly (p < 0.0006).[2] The skipping of breakfast has been associated with lower nutritional status and cardiovascular diseases.[13] It has also been reported that inappropriate breakfast habits may lead to the appearance and progression of obesity.[14] As regards fast food consumption, a study was conducted on Saudi medical students in Dammam. The results showed that 91.3% admitted eating fast foods. Approximately 25% do it twice or less every week, while 85% of males do it three times or more every week.[3] The evidence has clearly shown that fast food consumption is well related to the onset of cardiovascular disease.[15, 16] Daily caffeine consumption between the two groups did not differ much; the percentage of the female students who drank coffee daily was 57.1% compared to 39.3% of the male students (p=<0.001). The results aligned with other studies because their research outcomes also showed that medical students drank one coffee per day.[13, 17] Regarding physical activity, we asked the students if they engaged in exercise for 30 minutes or more. The results showed that most female groups rarely engaged in exercise (29.2%) compared to 21.4% among the male students. We also found that only 16.9% of the females exercised a few times per week than 21.4% of male students. Surprisingly, the study showed that 18.3% had never exercised among the female group compared to 15.5% among the male group (p=0.138). Diminished degrees of physical activity were associated with an increase in the prevalence of an overweight condition, obesity, and diet-related non-communicable diseases among the young.[18, 19] The two main barriers identified by medical students from most investigations were the absence of time and stress.[18, 20] Although different studies suggested that most medical students reported not having sufficient time to exercise and eat healthier meals because of their courses and clinical rotation demands.[18, 20] Regarding the social status of the students, female students were introverted primarily (65.8%), and the male students were also predominantly introverted (64.4%) (p=0.716). The female students also chose that they were somewhat satisfied with their social life (45.8%) compared to 42% in the male group, 30.6% of female students were satisfied compared to 43% in the male group (p=0.001). Introverted students will consider specific teaching settings more complicated than extroverted and outgoing students; these settings include group discussions with more than a few colleagues, locations where the establishment of fast relationships with students is expected, and environments where

thoughts need to be offered rapidly or decisively.[21] There was no much difference between the two groups vis-à-vis the smoking habit since the majority in both groups do not smoke a cigarette (p=0.001), electronic cigarette (p=<0.001), or shisha (p=0.032). A study indicated that friends' influence is the principal reason for smoking among college students, followed by stress, curiosity, and imitation of smokers.[22] In different studies carried out in other countries, and peer pressure was also identified as smoking.[23, 24] Thus, peer pressure among students was a definite factor in beginning the habit. Concerning psychological pressure, comparative findings were additionally reported in different nations.[25] Furthermore, most non-smokers reported that religion was the principal factor against smoking, followed by well-being consideration and smoking control policies.[22] During spare time activities, the percentage of female students who browsed social media was somewhat similar (80.1%) compared to male students (72.5%) (p=0.022). The number of male students who played a video game was 51.1% compared to 15% of the female students (p=<0.001). Also, the percentage of female students who engaged in their favorite hobbies was slightly higher (30.2%) compared to the male students (27.5%) (p=0.442). Furthermore, the number of females who read non-medical books was 33.6% compared to (21.7%) of the male group (p=0.001). It has been recognized that the nature of clinical training is generally distressing, and the pressure cannot be banished.[26] Thus, it is imperative to analyze medicinal and preventive stress intervention practices in the medical curriculum. An investigation suggested that students with negative perspectives toward free-time activities were the ones who reported encountering the most pressure. Since medical training stresses do not significantly reduce in actual practice, students who fail to figure out how to adapt to stress early may become miserable, unhealthy physicians.[27]

5. Limitations:

All data were self-reported and subject to reporting bias. Also, the investigation report provided here was established based on the bivariate comparison (female versus male medical students). Another limitation is that a student may comprehend each question distinctly. Thus, his/her answer might be based on his/her understanding of the question. Therefore, further investigations should be led in numerous worldwide settings to comprehensively assess medical students' healthy lifestyles and related factors before the findings are applied broadly to establishing health-promoting interventions.

6. Conclusions

The findings revealed that the vast majority of the medical students in Saudi Arabia exhibit healthy lifestyles to some extent, and these health-promoting behaviors differed by gender, especially regarding physical activity and eating patterns. The outcomes obtained here provide relevant information for future actions geared towards effectively decreasing chronic illnesses and improving population well-being.

Supplementary Materials: The following are available online at www.mdpi.com/xxx/s1, Figure S1: title, Table S1: title, Video S1: title.

Institutional Review Board Statement: The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the Institutional Review Board of the Imam Mohammad Ibn Saud Islamic University IRB committee number 68-2019 dated 17 November 2019.
Informed Consent Statement: Informed consent was obtained from all medical students involved in the study.
Conflicts of Interest: The authors declare no conflict of interest.

References

1. Carter AO, Elzubeir M, Abdulrazzaq YM, Revel AD, Townsend A. Health and lifestyle needs assessment of medical students in the United Arab Emirates. Medical Teacher. 2003;25:492–6.

2. Sakamaki R, Toyama K, Amamoto R, Liu C-J, Shinfuku N. Nutritional knowledge, food habits and health attitude of Chinese university students –a cross-sectional study–. Nutr J. 2005;4:4.

3. Al-Qahtani MH. Dietary Habits of Saudi Medical Students at the University of Dammam. Int J Health Sci (Qassim). 2016;10:353–62.

4. Grygiel-Górniak B, Tomczak A, Krulikowska N, Przysławski J, Seraszek-Jaros A, Kaczmarek E. Physical activity, nutritional status, and dietary habits of students of a medical university. Sport Sci Health. 2016;12:261–7.

5. Bin Abdulrahman K, Harden R, Patrício M. Medical education in Saudi Arabia: an exciting journey. Med Teach. 2012;34 Suppl 1:S4-5.

6. Bin Abdulrahman KA. The current status of medical education in the Gulf Cooperation Council countries. Ann Saudi Med. 2008;28:83–8.

7. Aldayel AA, Alali AO, Altuwaim AA, Alhussain HA, Aljasser KA, Bin Abdulrahman KA, et al. Problem-based learning: medical students' perception toward their educational environment at Al-Imam Mohammad Ibn Saud Islamic University. Adv Med Educ Pract. 2019;10:95–104.

8. Liew S-C, Sidhu J, Barua A. The relationship between learning preferences (styles and approaches) and learning outcomes among pre-clinical undergraduate medical students. BMC Med Educ. 2015;15:44.

9. Mokbel Alissa E. Knowledge, Attitude and Practice of Dietary and Lifestyle Habits Among Medical Students in King Abdulaziz University, Saudi Arabia. IJNFS. 2015;4:650.

10. Frank E, Carrera J, Elon L, Hertzberg V. Basic Demographics, Health Practices, and Health Status of U.S. Medical Students. American Journal of Preventive Medicine. 2006;31:499–505.

11. Hendrie GA, Coveney J, Cox D. Exploring nutrition knowledge and the demographic variation in knowledge levels in an Australian community sample. Public Health Nutr. 2008;11:1365–71.

12. Swanson LM, Arnedt JT, Rosekind MR, Belenky G, Balkin TJ, Drake C. Sleep disorders, and work performance: findings from the 2008 National Sleep Foundation Sleep in America poll: Sleep disorders and work performance. Journal of Sleep Research. 2011;20:487–94.

13. Sakata K, Matumura Y, Yoshimura N, Tamaki J, Hashimoto T, Oguri S, et al. [Relationship between skipping breakfast and cardiovascular disease risk factors in the national nutrition survey data]. [Nihon koshu eisei zasshi] Japanese journal of public health. 2001;48:837–41.

14. Ortega RM, Redondo MR, López-Sobaler AM, Quintas ME, Zamora MJ, Andrés P, et al. Associations between obesity, breakfast-time food habits and intake of energy and nutrients in a group of elderly Madrid residents. Journal of the American College of Nutrition. 1996;15:65–72.

15. Heidemann Christin, Schulze Matthias B., Franco Oscar H., van Dam Rob M., Mantzoros Christos S., Hu Frank B. Dietary Patterns and Risk of Mortality From Cardiovascular Disease, Cancer, and All Causes in a Prospective Cohort of Women. Circulation. 2008;118:230–7.

16. Nettleton JA, Polak JF, Tracy R, Burke GL, Jacobs DR. Dietary patterns and incident cardiovascular disease in the Multi-Ethnic Study of Atherosclerosis. The American Journal of Clinical Nutrition. 2009;90:647–54.

17. U.S. Census Bureau. (2003). American factfinder. https://www.google.com.sa/?gfe_rd=cr&ei=PWFrVI-CCKyG8QeA3ID4Cw&gws_rd=ssl. Accessed 20 Mar 2021.

18. Troyer D, Ullrich IH, Yeater RA, Hopewell R. Physical activity and condition, dietary habits, and serum lipids in second-year medical students. Journal of the American College of Nutrition. 1990;9:303–7.

19. Du S, Lu B, Zhai F, Popkin BM. A new stage of the nutrition transition in China. Public Health Nutr. 2002;5:169–74.

20. Conroy MB, Delichatsios HK, Hafler JP, Rigotti NA. Impact of a preventive medicine and nutrition curriculum for medical students. American Journal of Preventive Medicine. 2004;27:77–80.

21. Davidson B, Gillies RA, Pelletier AL. Introversion and Medical Student Education: Challenges for Both Students and Educators. Teaching and Learning in Medicine. 2015;27:99–104.

22. Almutairi KM. Smoking Among Saudi Students: A Review of Risk Factors and Early Intentions of Smoking. J Community Health. 2014;39:901–7.

23. Oh DL, Heck JE, Dresler C, Allwright S, Haglund M, Del Mazo SS, et al. Determinants of smoking initiation among women in five European countries: a cross-sectional survey. BMC Public Health. 2010;10:74.

24. Rudatsikira E, Muula AS, Siziya S. Current cigarette smoking among in-school American youth: results from the 2004 National Youth Tobacco Survey. Int J Equity Health. 2009;8:10.

25. Warren CW, Sinha DN, Lee J, Lea V, Jones NR. Tobacco use, exposure to secondhand smoke, and cessation counseling among medical students: cross-country data from the Global Health Professions Student Survey (GHPSS), 2005-2008. BMC Public Health. 2011;11:72.

26. Eysenck MW. Anxiety, learning, and memory: A reconceptualization. Journal of Research in Personality. 1979;13:363–85.

27. Folse ML, DaRosa DA, Folse R. The relationship between stress and attitudes toward leisure among first-year medical students. Journal of Medical Education. 1985;60:610–7.