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ABSTRACT Health professional entry-to-practice programmes are intense, competitive and prolonged. The aims of this study were to benchmark the health of health sciences students at Kuwait University, thereby informing student health services, and to establish a base for individual student's health assessments throughout the programmes. We used a convenience sample of 176 students. Assessment included a health/wellness questionnaire (smoking, nutrition, physical activity, sleep and stress) and objective measures (resting heart rate, blood pressure, waist-to-hip ratio and random blood glucose). Students had suboptimal activity, diet, stress and sleep. Health was suboptimal based on significant proportions of students in unhealthy categories for resting heart rate, blood pressure and body composition. Health status of health sciences students at Kuwait University is not consistent with healthy health professionals in training, who should serve as role models for the public. A culture of health on campus is recommended to maximize the health of students and their capacity as health role models.

Mesurer la santé des étudiants en sciences médicales à l'Université du

Koweït : vers une culture de la santé

Les programmes de formation des professionnels de la santé sont intenses, compétitifs et longs. La présente étude visait à mesurer la santé des étudiants dans les facultés du Centre de Sciences médicales de l'Université du Koweït, permettant ainsi d'orienter les services de santé étudiante et d'établir des données de référence pour l'évaluation de la santé des étudiants dans l'ensemble des programmes. Nous avons recouru à un échantillon de commodité de 176 étudiants. L'évaluation incluait un questionnaire sur la santé/le bien-être (tabagisme, nutrition, activité physique, sommeil et stress) et des mesures objectives (rythme cardiaque au repos, tension artérielle, rapport taille-hanche, et glycémie aléatoire). Les résultats ont montré que les étudiants avaient des niveaux d'activité, des régimes alimentaires, un niveau de stress et un sommeil suboptimaux. L'état de santé n'était pas optimal pour une proportion importante des étudiants ayant des mauvais résultats pour la composition corporelle, la fréquence cardiaque et la pression artérielle. L'état de santé des étudiants en sciences médicales de l'Université du Koweït ne correspond pas à ce que l'on attend de professionnels de la santé en formation, qui devraient servir de modèle pour le grand public. Une « culture de la santé » sur le campus est recommandée pour améliorer la santé des étudiants et leur capacité à servir de modèle pour les modes de vie sain.

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Introduction

The World Health Organization (WHO) has published several reports regarding the global pandemic of lifestyle-related non-communicable diseases (NCDs) (1,2), which are priorities for the State of Kuwait (3,4). The role of health professionals in future decades will focus largely on preventing, reversing and managing these diseases and their risk factors in adults and children. Generally, university students do not have lifestyles consistent with healthy living (5,6), thus, health professionals in training are not being credible health advocates, given academic pressures, stress, scarce resources and limited time to devote to healthy pursuits. One recent study of 787 Kuwaiti university students reported overweight and inactivity as health priorities, consistent with findings across universities in the Middle East (7,8).

The Health Sciences Campus at Kuwait University consists of four faculties (Allied Health Sciences, Dentistry, Medicine and Pharmacy) and one preparatory program (Health Sciences) for students entering Dentistry, Medicine or Pharmacy. These academic units are committed to educating health professionals who are competitive globally (9,10) and serve as leaders in entry-to-practice education in the Middle East.

Systematic development of a culture of health on the Health Sciences Campus of Kuwait University is timely for several reasons. First, this initiative is consistent with a recent seminal report on lifestyle-related NCDs in Kuwait (11). Second, students emerging from these health professional programmes need to support the overall health of their patients and their communities; one way is to serve as credible role models for health promotion (12,13). This is especially true in the current health climate where NCDs that are largely lifestyle related are the leading causes of premature death and disability in the Middle East including Kuwait (4,14–16).

An underexploited but powerful means of addressing Kuwait's leading healthcare priorities is through health professionals serving as health role models for their patients (12,13). Health professionals who adopt healthy lifestyles tend to promote healthy living practices and are viewed as being more credible health professionals by their patients (17). Consistent with its goals for being a regional leader, Kuwait University could serve as a role model for promoting health on its campuses and to other universities throughout the Middle East.

Establishing a culture of health within the Health Sciences Campus at Kuwait University is timely and has been endorsed by the University. Data are needed to inform the building of such a culture. Therefore, the aims of our study were twofold: (1) to benchmark students' health across academic units, thereby informing student health services; and (2) to establish a base for students' serial health assessments across successive years of their programmes. This work provides the foundation for an ongoing longitudinal database at Kuwait University.

Methods

Research design

We used a cross-sectional design. The study was ethically approved by the Institutional Review Board. Participants provided informed consent and were assured of information confidentiality. Only the primary investigator had access to the participants' names and code numbers.

Study sample

We used a convenience sample of students enrolled in the health sciences at Kuwait University. They were invited to participate in the study through word-of-mouth and recruitment notices. There were 104 women and 72 men [mean (standard deviation; SD) age of 21 (2.4) years], which was consistent with the 3: 2 sex ratio of students in the health sciences. The sample comprised ~10% of the eligible students, given that a high proportion were off campus for clinical fieldwork. Of 12 self-reported comorbidities, anaemia (16.8%) and obesity (11.2%) were the most common. The data were collected in term 1 of the 2014–2015 academic year in preparation for the longitudinal campus initiative and study of participants' health status throughout their academic programmes.

Procedures

Two weeks before data collection, the campus health initiative and initial study were publicized across campus, including to faculty deans. Students were offered personalized health promotion plans in exchange for volunteering. Data collection comprised a health questionnaire and objective measures and was conducted in a central campus location with separate areas for assessment of men and women. Seven researchers were trained in the testing procedures to minimize intra- and inter-tester variability. Participants self-completed the health questionnaire within 25 minutes. The objective testing required 10 minutes.

Health-related questionnaire and objective measures

The health questionnaire included several components in a closed-end question format (61 questions): (1) personal demographic information; (2) a checklist of common health conditions; (3) self-reported health behaviour profiles related to smoking, nutrition, physical activity, stress and sleep (composite of existing questionnaires from 18–20); and (4) rating of quality of life over the past month [visual analogue scale (VAS) ranging from 0 to 10 or extremely low to extremely high], and a self-efficacy rating of confidence to effect change in health behaviour (5-point Likert scale ranging from 1 or not at all confident to 5 or extremely confident). The reliability of these composite scales was established based on test–retest analysis described below (18).

Questionnaire reliability was established using test–retest methodology. Twenty-five individuals comparable to the study cohort completed the questionnaire on two successive occasions. Cronbach's α was calculated to estimate the internal consistency of each subscale and strong internal consistency was observed (0 .76). Cohen's κ was calculated for each question to determine agreement between the 1st and 2nd test for reliability. Moderate to strong agreement was identified (0.53–0.78).

Objective health status was assessed with established measures. Blood pressure was measured with a digital sphygmomanometer (Gima, Milan, Italy) and heart rate was measured

with a finger pulse oximeter (AG Industries, St. Louis, MO, USA). After a 20-min rest, we measured blood pressure 3 times and recorded the average. Corresponding heart rates were recorded and averaged. For body mass and composition measures, participants emptied their pockets and removed outer clothing, belts, jewellery, glasses and shoes. A standard calibrated conventional scale was used for weight and height measurements and body mass index (BMI) (kg/m2) was calculated. Standard procedures were used to measure waist and hip girth, and waist-to-hip and waist-to-height ratios were calculated. We used a flexible nonstretch tape to measure the waist at the smallest girth and the hips at the largest girth, after tidal expiration. Random blood sugar level was recorded based on an established finger prick procedure (Accu-Check Performa; Roche, Basel, Switzerland).

Statistical analysis

We used SPSS version 21 (IBM, Chicago, IL, USA) for all analyses. Data were analysed using descriptive statistics [mean (SD) and confidence intervals (CIs)]. With respect to nutrition, food servings and serving sizes, we used Canadian guidelines, which are similar to the health-protective Mediterranean diet recommended for Middle Easterners (18,19). Fisher's exact tests were used to compare the findings across academic units. With respect to the objective measures, frequencies were calculated for participant data that were within and outside established healthy limits for the variables of interest (Appendix). The $\chi 2$ and Fisher's exact tests were conducted with respect to the proportions of participants whose values fell within and outside healthy ranges of health behaviours, attributes and objective measures. Alpha was set at 0.05.

Results

Lifestyle behaviour

Lifestyle variables are shown in Table 1 . Among the men, 80.6% did not smoke compared with 98.1% of the women. The highest numbers of smokers were in the Faculties of Allied Health Sciences (n = 8; 17.4%) and Medicine (n = 8; 18.6%). Students in the Faculties of Allied Health and Medicine were the highest in reporting no physical activity, with 11 (23.9%) and 10 (23.3%), respectively. Overall, 43 (57.3%) male participants met physical activity guidelines, whereas only 45 (43.3%) female participants did. Fifteen (20.3%) male participants reported manageable stress compared with 9 (8.8%) female participants. Greatest stress was reported by participants in the Faculty of Dentistry (n = 13; 72.2%). Less than half of male participants (n = 22; 44.9%) slept for ≥ 8 h nightly, whereas over half of female participants (n = 27; 55.1%) did so. Those reporting the least sleep (

Nutritional practices are shown in Table 2 . Only 9 (5.1%) participants met the recommended daily servings of fruit and 4 (2.3%) reported meeting these for vegetables. More female participants (n = 58; 55.7%) met the limited requirements of red meat consumption compared with male participants (n = 16; 22.2%), and likewise for egg consumption (93; 60.8% vs 60; 39.2%, respectively). Male participants (n = 27; 57.4%) fared better than female participants (n = 20; 42.6%) in terms of recommended weekly fish consumption. Only 13 (7.4%) participants

avoided fast food entirely (food associated with poor nutritional quality, and with high fat, sugar and salt content). Female participants (n = 72; 70.6%) ate breakfast more regularly than male participants (n = 42; 58.3%).

Quality of life and health behaviour change self-efficacy

Overall, participants rated their quality of life on average as 6.99 (1.79) (range 3–10) on a VAS. They reported having multiple unhealthy lifestyle behaviours/attributes (Tables 1 and 2). When they rated themselves as having unhealthy lifestyle behaviours/attributes, participants rated their confidence to change a given behaviour mostly as moderate or 3 on the 5-point Likert scale. Of the 5 lifestyle behaviours/attributes, managing stress and improving sleep were those that participants reported most often as having no confidence at all to change. With respect to stress management, female participants appeared more confident than male participants to institute strategies to manage stress.

Objective measures

Objective measures are shown in Table 4 . Overall, 58 (56.3%) female participants had BMI within the healthy range, compared with 27 (36%) male participants. BMI in male participants tended to exceed 25 kg/m2 more than in female participants across the academic units, with 27.7 (5.3) in Medicine and 27.8 (7.6) in Pharmacy being the highest. Seventy (39.3%) male and 102 (99%) female participants were within healthy sex-specific ranges for waist-to-hip ratios. With respect to waist-to-height ratios, only 47 (62.7%) male and 86 (83.5%) female participants were within the healthy range. Resting heart rates were within the healthy range for only 33 (44%) male and 36 (35%) female participants. Healthy resting systolic blood pressure was recorded for 13 (17.6%) male and 71(69.6%) female participants. Healthy resting diastolic blood pressure was recorded in 54 (73%) male and 88 (86.3%) female participants.

Discussion

This study collected data for students participating in the longitudinal health initiative at Kuwait University. Participation in this ongoing health initiative is voluntary. We hope that the health sciences community will volunteer to participate or be positively influenced by studying in a social and physical environment that supports a culture of health, which needs to be promoted among health professionals in training.

The prevalence of smoking was 34.4% (95% CI=32.2–36.6) among men, which is consistent with the general male population in Kuwait, and 1.9% (95% CI=1.3–2.5) among women (20). No amount of smoking is advisable for good health and it is a leading contributor to morbidity and premature death (21). In progressive societies, clean-air, smoke-free campuses are the goal.

Kuwait is within the Eastern Mediterranean Region of the WHO and consequently, plant-based Mediterranean-type diets have been advocated (19). Such diets have been consistently shown to have multiple health benefits and are superior to the standard western diet. They are high in recommended servings of fruit, vegetables, multi-grains and fish. They are low in added sugar and salt, and favour unsaturated vegetable oil over saturated animal fats. Our student cohort fell short of the recommended daily servings of fruit and vegetables, which is consistent with the general Kuwaiti adult population (22). Despite being emerging health professionals, participants do not appear to make healthier food choices than the general public. Red meat consumption was higher than that recommended and fish consumption was lower; both of which are health risk factors. When Mediterranean-type diets are studied, people who consume fish twice a week have a 47% reduced risk of cardiac mortality compared with those who eat fish less than once a month (23). In addition, cereal fibre (two whole-grain slices of bread daily) is associated with a 14% reduced risk of myocardial infarction or stroke. Cereal fibre consumption even later in life is associated with reduced incidence of cardiovascular disease (24).

Fast food, soft drinks, sweets and added sugar and salt are not consistent with healthy nutrition, and should only be consumed sparingly. Like university students in other countries, Kuwaiti students likely eat sporadically given time constraints and the potential for emotional eating to offset stress (25). The tendency for Kuwaiti students to be overweight/obese probably reflects poor nutritional choices and inactivity (6).

Eighty-eight (49.2%) participants reported being generally physically active for 2.5 h/week and 42 (23.5%) reported moderately intense physical activity for 2.5 h/week. The latter is the established guideline for the American population and has been adopted by other countries (26).

Another consideration is prolonged sitting, which is an unfortunate consequence of student life and the dominance of sedentary screen-based activities. Sedentary behaviour is viewed as the “new smoking” in terms of major health risk, with tools emerging to assess it systematically (27). Prolonged sitting is an independent cardiometabolic risk factor (28) and warrants priority attention in this at-risk cohort. In addition to tracking physical activity patterns in students, our future data collection will incorporate a sedentary behaviour questionnaire (29).

Individuals vary considerably regarding their resilience to life stressors. Compared with non-university young adults, university students have disproportionately high levels of unrelenting stress (30). These data mostly relate to the experience of western students and less

is known about the stress of Middle Eastern students. The additional stress of studying health sciences in a non-native language, as Kuwaiti students do, warrants study.

People are sleeping 1.5–2 hours less each night than 100 years ago, and reduced sleep has been associated with NCDs (31). The average young adult sleeps 7–7.5 hours, with individual differences in sleep need, and this amounts to sleep debt and related physical and mental health consequences.

Few studies have examined university students' quality of life and none in Kuwait. Our students' quality of life was rated on average as 6.99 (1.79) (range 3–10). Contributors to poor quality of life in this cohort warrant evaluation.

We posed several questions to students in the health questionnaire about their confidence to effect lifestyle behaviour changes. They reported their confidence as moderate. This is encouraging given confidence is an index of behaviour change self-efficacy (32). This knowledge is important in designing targeted health programmes. Whether students' perceptions about their self-efficacy to change lifestyle behaviour can be generalized to their views about their patients' self-efficacy is an important research question.

This study had several limitations. Compared to random samples, participants in our convenience sample were volunteers and needed to give their consent, which could have skewed the data. Those who were health conscious may have been motivated to participate, and those who were not health conscious may have opted not to participate, or conceivably could have been curious and interested in participating. We have no reason to believe that we selectively attracted students with particular health risks. In addition, questionnaire health data are limited by being self-reported. We aimed to maximize the validity of the self-reported data by assuring confidentiality and requested maximal reporting accuracy. We are interested in individual data and improving students' health over the course of their studies, therefore, we focused less on the generalizability of our findings. However, given the exploratory nature of this study, we estimate that an appropriate sample size for future baseline studies should be at least 326 based on an analysis with 80% power and 5% significance level. Finally, we used a composite quality of life and general life satisfaction scale (11 points ranging from extremely low to extremely high) and a 5-item response scale rating confidence to change 5 lifestyle behaviours as needed. These scales were reliable, thus, we are confident that they can be used to compare individuals with themselves over time. Their validity will be confirmed in future studies based on established tools (18).

Several future studies to evaluate the health of the Kuwait University health sciences community are indicated. First, ongoing recruitment will be undertaken with each new academic year to establish baseline health status for each student, with a view to instilling a commitment to personal health. We then propose to carry out longitudinal evaluations over each year of the student's programme. Annual data will identify target areas for health behaviour change, hence, campus-wide health education programmes will be developed and evaluated accordingly. Given that health education resources and personnel can be costly, establishing the cost-effectiveness of such programmes is essential. Outcomes of health promotion within the university culture of health will be extended to include those related to changes in lifestyle health beliefs and practices, and the role of self-efficacy in changing individuals' health behaviour. Finally, we plan to extend this initiative to the health of academic faculty and nonacademic staff, because they comprise a substantial proportion of the university community and serve as role models to the students.

Conclusion

The health sciences students at Kuwait University who volunteered were uniformly of suboptimal health in relation to several dimensions of lifestyle behaviour and objective measures. Of concern, students reported suboptimal nutrition, including high intake of nutritionally poor, calorie-dense foods (consistent with low vegetable intake and high fast food consumption), which was reflected in high BMI. In addition, unmanageable stress was a common student concern. Compared to participants in a random sample, those in our convenience sample needed to volunteer and give their consent, thus limiting our ability to generalize findings. Nonetheless, we believe that the uniqueness of this initiative is serial health assessments of student volunteers where the focus is on comparing their own data over time. We had no reason to believe that students with health risks were more likely to volunteer, however, this warrants study. Our findings justify the development of student health-promoting initiatives through the establishment of a culture of health on campus. The outcomes of such initiatives will be evaluated over time. Our intention is to increase students' personal health awareness and improve health practices and wellbeing, in turn, maximize their potential as health role models to their patients as students, and as health professionals throughout their careers.

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