Nutritional status of undergraduate healthcare students at the University of the Free State

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Abstract

Objectives: This study aimed to evaluate the lifestyle habits of South African students preparing for careers in health care that could influence the efficacy of their counselling practices on risk factors for noncommunicable diseases (NCDs) as future healthcare professionals.

Design: Cross-sectional descriptive study.

Setting and subjects: One hundred and sixty-one students (median age 21.5 years, 75.8% women) enrolled in the Faculty of Health Sciences at the University of the Free State.

Outcome measures: Anthropometry was measured and structured questionnaires administered to assess dietary and lifestyle habits.

Results: Many students were at risk of NCDs, with 19.8% being overweight or obese (body mass index > 25 kg/m^2), 11.8% had a waist circumferences above gender-specific cut-off points, 98.1% consumed < 3 servings of vegetables/day, 58.4% consumed < 2 servings of fruit/day, 83% consumed < 2 servings of dairy products/day, 60% did not eat a beta-carotene-rich fruit or vegetable daily, 31% did not eat a vitamin C-rich fruit or vegetable daily, 62% never consumed legumes, 43% reported a high intake of fats and sweets, 11% smoked a median of 3.5 cigarettes/day and 63% consumed a median of three drinks of alcohol/day on a median of four days (95% weekend days) per month. Fifty-nine per cent were active and 39% were very active owing to busy class schedules, but only 32% participated in formal exercise and sports.

Conclusion: The poor dietary and lifestyle habits of most participants highlight the need to not just educate, but better empower these students to deal with the growing public health problem of obesity and related NCDs in the country.

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Introduction

Currently, noncommunicable diseases (NCDs) represent 43% of the global burden of disease, with over 80% of NCD-related deaths estimated to occur in low- and middle-income countries.[1] NCDs are projected to overtake infectious diseases as causes of morbidity and mortality in developing countries by 2030.[2] Cross-sectional and prospective studies have identified diet and lifestyle as modifiable risk factors for many NCDs, including obesity, atherosclerosis, coronary heart disease, hypertension, diabetes and cancer.[1]

The rising incidence of NCDs in developing countries, including South Africa, is linked to the nutrition transition that occurs with urbanisation, and which is characterised by an increased intake of energy, saturated fats, cholesterol, added sugar and sodium; and a decreased intake of fibre, vegetables, fruit and legumes. The transition is also associated with increasing levels of obesity, inactivity, tobacco smoking and excessive alcohol consumption.[3-5]

The South African Demographic and Health Survey (SADHS),[6] conducted in 2003, reported that 29.8% of South African men and 54.7% of women (≥ 15 years) were overweight or obese [body mass index (BMI) > 25 kg/m^2]. The mean waist circumference for South African women in the SADHS was 82.7 cm,[6] which is above the cut-off point for sub-Saharan women (< 80 cm), and therefore constitutes an increased risk of NCDs.[7] More than half (57.1%) of the participants were physically inactive, 31.5%

of men and 9.1% of women smoked daily, and 12% men and 14% women consumed harmful to hazardous amounts of alcohol.[6] The impact of these trends was evidenced by the South African National Burden of Disease Study, which estimated that NCDs accounted for 27.1% of all deaths in the country in 2000, while tobacco smoking, alcohol harm, a high BMI, physical inactivity, and low fruit and vegetable intake, contributed 8.5%, 7.1%, 7.0%, 3.3% and 3.2% to total deaths, respectively.[8]

In the Global Strategy on Diet, Physical Activity and Health, the World Health Organization recognises health promotion as a key element in the prevention of NCDs.[9] Counselling interventions, also in the primary healthcare setting, have been proven to be effective in bringing about weight loss and lifestyle changes to reduce the risk of cardiovascular disease (CVD) and other NCDs in adults.[10-12] A recent systematic review concluded that healthcare professionals were more likely to discuss weight, diet and lifestyle issues with their patients and use strategies to prevent obesity in patients, if they themselves had a normal BMI.[13] Similarly, health professionals' own physical activity practices and smoking habits influenced the likelihood of them counselling patients on exercise habits[14] and smoking cessation.[15]

Unfortunately, healthcare professionals are not immune to overweight and obesity and lifestyles that promote weight gain. In Europe, a survey of 2 082 general practitioners at 11 national colleges reported that 39% of them were overweight or obese,[16] while a report from the UK Department of Health found that of the 1.2 million staff in the National Health Service survey, 58% were classified as overweight or obese.[17] Similarly, a survey that included 3 213 Canadian physicians, reported that 8% of respondents were obese,[18] while in the USA, a survey on 760 nurses found that almost 54% were overweight or obese.[19]

Sound knowledge, attitudes and practices regarding diet, lifestyle and weight should be developed during healthcare professionals' training. This study was undertaken to assess body weight status, eating practices, physical activity levels (PALs) and the lifestyle habits of undergraduate students preparing for careers as healthcare professionals at the University of the Free State.

Method

A cross-sectional descriptive study was carried out on the undergraduate students enrolled in the Faculty of Health Sciences at the University of the Free State in 2007. A representative sample of 242 students was selected by a systematic sampling method from the admissions list obtained from the institution. These students were contacted by phone and invited to participate in the study. A total of 161 students gave informed consent and were included in the study (a response rate of 66.5%).

The diagnosis of overweight or obesity, and the risk of NCDs, was based on BMI and waist circumference, respectively, as recommended by both the International Association for the Study of Obesity (IASO) and the Southern African Society for the Study of Obesity.[20] All measurements were taken in light clothing and without shoes by the same trained researcher, using standardised techniques.[21] The average of three measurements was recorded.

Structured one-on-one interviews with the students were performed in private in a room at the Department of Nutrition and Dietetics of the University of the Free State. Eating practices were established by obtaining a record of usual daily intake during structured interviews. Intake was quantified into servings from the different food groups using standard exchange lists. The exchange lists were compiled according to the recommendations of the American Dietetic Association,[22] and specifically adapted for South African food by quantifying portion sizes from the South African Medical Research Council's (MRC) Food Composition Tables[23] and the MRC Food Quantity Tables.[24]

Usual daily food intake was quantified as servings from the different food groups, and compared to the recommendations of the 1992 US Department of Agriculture's Food Guide Pyramid (USDA-FGP),[25] as this tool quantifies the recommended daily number of portions to be consumed from each food group, as opposed to the South African Food-Based Dietary Guidelines,[26] which is a list of qualitative statements and is taught in the South African schools curricula, so the students should be familiar with it.

The exchange lists were also used to calculate daily energy and macronutrient intake. Fat and sugar intake were compared to the Dietary Approach to Stop Hypertension recommendations for different levels of energy intake according to the recommendation of the Dietary Guidelines for Americans, 2010.[27] A short food frequency questionnaire was adapted to reflect the food choices of students, and used to determine how often particular foods were consumed.

During the structured interviews, PALs were determined using the Previous Day Physical Activity Recall,[28] excluding Saturday. PAL values for various activities performed throughout the day were calculated[28] and added up to determine the total daily PAL for each individual. Total daily PAL was categorised as sedentary (1-1.39 PAL), low active (1.40-1.59 PAL), active (1.60-1.89 PAL), or very active (1.90-2.50 PAL) according to the recommendations of the US Institute of Medicine, National Academy of Sciences.[28] Questions relating to smoking habits and alcohol intake were also asked during the interviews.

The study protocol was approved by the Ethics Committee of the Faculty of Health Sciences, University of the Free State (ETOVS No 63/06). Permission to carry out the research was obtained from the Vice Rector: Academic Planning, from the Deputy Dean: Student Affairs, and from the Heads of the Schools of Medicine, Nursing, and Allied Health Professions prior to the study. All students were pre-informed in writing about the purpose of the study and of the procedures to be used during the research. Students who agreed to these terms signed consent forms. Statistical data analysis was performed by the Department of Biostatistics of the Faculty of Health Sciences of the University of the Free State, and was generated by SAS® software. Categorical data were presented as frequencies and percentages, and continuous data as medians and percentiles. To compare groups, 95% confidence interval (CI) for the median differences or percentage differences was used.

Results

The sample of 161 students had a median age of 21.5 years (ranging from 17.9-45.6 years) and 75.8% were women (Table I). The majority of the students were in their third (36%) and fourth (32.3%) academic years. Most studied medicine (43.5%), spoke Afrikaans (63.4%), were single (95.7%), and lived off campus (67%). Those residing in university residences were responsible for procuring or preparing their own meals as the campus did not offer a food service at the time of the study.

Based on BMI classification, 19.8% of the students were overweight or obese, with more women (22.1%) than men (12.8%) falling into this category (Table II). The waist circumference values indicated that 11.8% of the students were at risk of metabolic syndrome and NCDs.[5]

Breakfast was eaten regularly by 93.2% of the students, lunch by 99.4% and dinner by 96.3%. The median intake of carbohydrates, protein, fat and energy are listed in Table III. The median energy intake of the women (5 195 kJ) was significantly lower than that of the men (8 943 kJ) [95% CI for median difference (2 773, 4 891)]. Overweight or obese students had a higher median energy intake (7 220 kJ) than students with a normal BMI (5 952 kJ), as well as underweight students (6 285 kJ) (Table III), but none of the differences were significant.

The usual daily food intake of all the students, obtained from the recalled daily food records, was compared to the recommendations of the USDA-FGP in Table IV. The majority of the students did not meet the minimum daily requirements for vegetables (98.1%) and fruit (58.4%). Only 0.6% and 12.4% of the students reported a high intake of vegetables (e.g. more than three servings per day) and fruit (e.g. more than two servings per day), respectively.

Table I: Socio-demographic information of healthcare students (n = 161)

Variable	n	%
Age (n = 159)		
Male	39	24.2
Female	122	75.8
Gender (n = 161)		
Male	39	24.2
Female	122	75.8
Place of residence (n = 161)		
On campus	52	32.3
Off campus	109	67.7
Academic level (n = 161)		
First year	19	11.8
Second year	22	13.7
Third year	58	36
Fourth year	52	32.3
Fifth year	10	6.2
Department (n = 161)		
Medicine	70	43.4
Nursing	25	15.5
Physiotherapy	17	10.6
Optometry	17	10.6
Occupational therapy	14	8.7
Human biology	1	0.6
Radiation	5	3.1
Human nutrition	12	7.5
Marital status (n = 161)		
Single	154	95.7
Engaged	2	1.2
Married	5	3.1
Divorced	0	0
Language (n = 161)		
Afrikaans	102	63.4
Sotho	23	14.3
English	24	14.9
Tswana	5	3.1
Other: Xhosa (n = 4), Zulu (n = 2) and *Siswati* (n = 1)	7	4.3

Most students (60.2%) did not consume a beta-carotene-rich vegetable or fruit daily, while 30.6% did not consume a vitamin C-rich vegetable or fruit daily. Most students (82.6%) consumed fewer than two servings of milk and dairy products per day, and 43.7% consumed fewer than six portions of bread, cereal, rice and pasta daily. Few students reported a higher-than-recommended intake of milk and dairy products (2.5%) and bread, cereal, rice and pasta (14.4%). Most students (83.9%) reported an intake above the minimum recommendations (2-3 servings) from the meat and meat substitute food group, which includes red meat, poultry, fish, legumes, eggs and nuts.

Table II: Weight status and fat distribution of healthcare students (n = 161)

Category	n	%
BMI (kg/m²)*		
Men and women combined (n = 161)		
Underweight (BMI < 18.5 kg/m²)	13	8.1
Normal weight (BMI 18.5-24.9 kg/m²)	116	72.1
Overweight or obese (BMI > 25 kg/m²)	32	19.8
Men (n = 39)		
Underweight (BMI < 18.5 kg/m²)	0	0
Normal weight (BMI 18.5-24.9 kg/m²)	34	87.2
Overweight or obese (BMI > 25 kg/m²)	5	12.8
Women (n = 122)		
Underweight (BMI < 18.5 kg/m²)	13	10.7
Normal weight (BMI 18.5-24.9 kg/m²)	82	67.2
Overweight or obese (BMI > 25 kg/m²)	27	22.1
Waist circumference		
Men and women combined (n = 161)		
Ideal category: < 94 cm (men) and < 80 cm (women)	142	88.2
At risk of metabolic syndrome** and obesity-related NCDs***: ≥ 94 cm (men) and ≥ 80 cm (women)	19	11.8
Men (n = 39)		
Ideal category: < 94 cm	36	92.3
At risk of metabolic syndrome** and obesity-related NCDs***: ≥ 94 cm	3	7.7
Women (n = 122)		
Ideal category: < 80 cm	106	86.9
At risk of insulin resistance, metabolic syndrome** and related NCDs***: ≥ 80 cm	16	13.1

BMI: body mass index, NCDs: noncommunicable diseases
*Body mass index, as defined by the Southern African Society for the Study of Obesity's guidelines for the prevention and management of overweight and obesity in South Africa[20]
**: Metabolic syndrome, as defined by Alberti et al[7]
***: Noncommunicable diseases, as defined by the Southern African Society for the Study of Obesity's guidelines for the prevention and management of overweight and obesity in South Africa[20]

In keeping with the findings from the recalled daily food records, the food frequency questionnaires (Table V) revealed that few students consumed vegetables (18.6%), fruit (29.8%) and fruit juice (15.5%) on a daily basis, while the majority (62.1%) reported never eating legumes. A relatively low percentage of students consumed carbohydrate foods like bread (31.1%), porridge (2.5%), cereal (1.2%) or samp or mealie rice (1.9%) on a daily basis. Approximately, a third of the students reported the daily consumption of coffee (34.8%) and tea (30.4%), while more than half (57.1%) used added sugar on a daily basis. Most students reported a weekly consumption of foods high in added sugar, fat and/or sodium, including sweets and chocolates (92.5%), crisps (88.2%), cakes and biscuits (87.6%) and soft drinks (77%).

Most students reported using alcohol on a weekly basis (65.2%), while none reported the daily consumption of

Table III: Total daily energy and macronutrient intake of healthcare students (n = 161)

	Lower quartile	Median (% of total energy)	Upper quartile
Variable for the entire group (n = 161)			
Carbohydrate (g)	132	192 (53.2)	266
Protein (g)	40	59 (16.3)	89
Fat (g)	32	49 (30.3)	85
Total energy (kJ)	4 077	6 137	8 186
Total energy per gender			
Men (n = 39)	7 020	8 943	11 983
Women (n = 122)	3 712	5 195	7 243
Total energy per BMI category			
< 18.5 kg/m² (n = 13)	3 720	6 285	7 689
18.5-24.9 kg/m² (n = 116)	4 034	5 952	8 028
> 25 kg/m² (n = 32)	5 024	7 220	8 853

BMI: body mass index

Table IV: The usual daily food intake of healthcare students (n = 161)

Food groups	Number of portions/day*	n	%
Breads, cereal, rice and pasta (n = 160)			
Below recommendations	< 6 servings/day	70	43.7
Within recommendations	6-11 servings/day	67	41.9
High intake	> 11 servings/day	23	14.4
Vegetables (n = 161)			
Below recommendations	< 3 servings/day	158	98.1
Within recommendations	3-5 servings/day	2	1.3
High intake	> 5 servings/day	1	0.6
Fruit (n = 161)			
Below recommendations	< 2 servings/day	94	58.4
Within recommendations	2-4 servings/day	47	29.2
High intake	> 4 servings/day	20	12.4
Beta-carotene-rich fruit and vegetables (n = 161)**			
Below recommendations	< 1 serving/day	97	60.2
Within recommendations	≥ 1 serving/day	64	39.8
Vitamin C-rich fruit and vegetables (n = 160)**			
Below recommendations	< 1 serving/day	49	30.6
Within recommendations	≥ 1 serving/day	111	69.4
Milk and dairy products (n = 161)			
Below recommendations	< 2 servings/day	133	82.6
Within recommendations	2-3 servings/day	24	14.9
High intake	> 3 servings/day	4	2.5
Meat, poultry, fish, legumes, eggs and nuts (n = 161)			
Below recommendations	< 2 servings/day	5	3.1
Within recommendations	2-3 servings/day	26	16.2
High intake	> 3 servings/day	134	80.8
Fats, oils and sweets (n = 161)			
Small quantities		92	57.1
Large quantities		69	42.9

*: Evaluated according to the recommendations of the US Department of Agriculture's Food Guide Pyramid[25]
**: Evaluated according to the US Department of Agriculture's and US Department of Health and Human Services'dietary guidelines for Americans[27]

Table V: Frequency of food consumption of students in healthcare professions (n = 161)

Food	Do not eat		Eat weekly		Eat daily	
	n	%	n	%	n	%
Sweets and chocolates	5	3.1	149	92.5	7	4.4
Chips (crisps)	19	11.8	142	88.2	0	0
Cakes and biscuits	16	9.9	141	87.6	4	2.5
Soft drinks	20	12.4	124	77	17	10.6
Non-dairy creamer	128	79.5	24	14.9	9	5.6
Coffee	36	22.3	69	42.9	56	34.8
Tea	35	21.7	77	47.8	49	30.4
Sugar	27	16.8	42	26.1	92	57.1
Eggs	23	14.3	134	83.2	4	2.5
Peanut butter	92	57.1	65	40.4	4	2.5
Soya mince or legumes (baked beans, peas and lentils)	100	62.1	59	36.7	2	1.2
Chicken, meat and fish	1	0.6	133	82.6	27	16.8
Bread	2	1.2	109	67.7	50	31.1
Cooked porridge	66	40.9	91	56.5	4	2.5
Ready-to-eat cereals, e.g. Morevit® and Pronutro®	32	19.9	127	78.9	2	1.2
Samp and mealie rice	74	45.9	84	52.1	3	1.9
Margarine, oil and fat	17	10.5	93	57.8	51	31.7
Fruit juice	15	9.3	121	75.2	25	15.5
Fruit	2	1.2	111	68.9	48	29.8
Vegetables	3	1.9	128	79.5	30	18.6
Alcohol	56	34.8	105	65.2	0	0

alcohol on the food frequency questionnaire. When asked for a second time on the alcohol questionnaire about their drinking habits, the majority of the students (62%) reported that they consumed alcohol, but on this questionnaire only 5% reported drinking on week days (Table VI a). Alcohol was consumed on a median of four days per month, which coincided with weekends in 95% of cases. The median intake of alcohol on these days was three units. Beer and spirits, followed by cider, white and red wine, were the preferred types of alcohol (Table VI b).

Of the total students participating in the study, 10.6% were current smokers (Table IV a) and smoke a median of 3.5 cigarettes per day (Table IV b). Smoking and alcohol consumption was positively associated and with a higher percentage of smokers (88.2%) than non-smokers (59.9%) consuming alcohol [95% CI (4.5%, 40.3%) for the percentage difference]. Alcohol consumption was significantly higher in students residing off campus (70.6%) than in those on campus (45.1%) [95% CI (-9.2%, -40%) for the percentage difference] (Table VI a).

The students were broadly classified according to their PALs as either very active (59%) and active (39%). However, 68% of the students did not attend gym, or participate in any sporting activities (Table VI a).

Table VI a: Smoking, alcohol consumption and physical activity of students in healthcare professions (n = 161)

Variable or question	n	%
Cigarette smoking		
Do you smoke? (n = 161)		
Yes	17	10.6
No	138	85.7
Previously	6	3.7
Alcohol consumption		
Do you consume alcohol? (n = 160)		
Yes	100	62.5
No	53	33.1
Previously	7	4.4
Type of alcohol usually consumed (n = 100)		
Red wine	45	45
White wine	45	45
Beer	19	19
Spirits	28	28
Cider	46	46
Alcohol consumption on week days versus weekends (n = 100)		
Only week days	0	0
Only weekends	95	95
Both	5	5
Alcohol consumption by students residing on campus (n = 51) versus those off campus (n = 109)		
On campus	21	45.1
Off campus	77	70.6
Alcohol consumption		
Non-smokers	82	59.9
Smokers	15	88.2
Physical activity		
Physical activity level* (n = 161)		
Sedentary	0	0
Low active	3	1.9
Active	63	39.1
Very active	95	59
Do you participate in gym, formal exercise or sports? (n = 161)		
Yes	51	31.7
No	110	68.3

*: Measured according to Institute of Medicine, National Academy of Sciences' dietary reference intakes for energy, carbohydrate, fibre, fat, fatty acids, cholesterol, protein, and amino acids[28]

Table IV b: Distribution of smoking and alcohol consumption of students in healthcare professions

Cigarette smoking (n = 16)			
Number of cigarettes per day	Minimum 0.75	Maximum 16	Median 4
Alcohol consumption (n = 99)			
Number of days or months on which alcohol is consumed	Minimum 0.75	Maximum 16	Median 14
Consumption of all types of alcohol (units/day) (n = 100) (1 unit = 125 ml wine/340 ml beer or cider/1 tot (45 ml) spirits	Minimum 0	Maximum 16	Median 3
Number of alcohol units/day constituted by each type of alcohol			Median
Beer			3
Spirits			3
Cider			2
Red wine			2
White wine			1.5

Discussion

The prevalence of overweight and obesity (a BMI > 25 kg/m^2) in students preparing for a career in the healthcare professions (19.8% in the entire group; 12.8% in the men and 22.1% in the women) was similar to that reported in students in North America in general,[29,30] but lower than that in healthcare graduates in Europe and North America.[16-19] However, the figures are lower than those recorded in the same year at the University of Fort Hare, Eastern Cape, where 96.3% of the predominantly black nursing students were found to be overweight and obese.[31] Although race was not recorded in the current study, obtained information from the enrolment office of the Faculty of Health Sciences at the University of the Free State indicates that in 2007, more than 50% of the students in the faculty were white.

Waist circumference is recommended by IASO[20] and the International Diabetes Federation[7] to predict the risk for insulin resistance and NCDs. In the current study, approximately one in 10 students (more women than men) had waist circumferences above the ethnic-specific cut-off points recommended for sub-Saharan Africans.[7] However, similar to BMI, the prevalence of at-risk waist circumferences was lower in these predominantly white students than it was in the predominantly black nursing students from the University of Fort Hare, where 65.2% of the participants were at risk of insulin resistance and metabolic syndrome, and thus NCDs.

An analysis of dietary patterns revealed typical Westernised practices characterised by a low intake of vegetables, fruit, legumes and dairy, and a high intake of meat, fats and sweets. Meat was also consumed on a daily basis by most of the predominantly white, female group and at higher-than-recommended amounts, with a relatively low intake of starch food, in contrast with the predominantly black nursing students at Fort Hare who consumed meat on a weekly basis, and starch food on a daily basis.[31]

Fruit, vegetables and legumes are sources of vitamins and minerals, as well as a wide variety of phytochemicals which protect against NCDs, such as CVD, type 2 diabetes and cancer, by various mechanisms which include acting as antioxidants that scavenge free radicals, enhancing the performance of the liver detoxification enzyme systems and suppressing cancer cell initiation and/or proliferation.[32,33] These food groups are also important sources of soluble fibre, which protect against CVD[34] and cancer.[33] Therefore, the findings that very few students consumed fruit and vegetables on a daily basis, and that most never consumed legumes, suggest a serious health risk. Low fruit and vegetable intake is considered to be an independent risk factor for mortality and caused 3.2% of all deaths in South Africa in 2000.[8]

Consuming adequate amounts of dairy products is considered to be the most practical, effective and relatively inexpensive (when compared to the cost of supplements) way in which to acquire adequate calcium to optimise bone density.[35] In a 2005 review of the evidence at the time, the US Dietary Guidelines Advisory Committee reported that all seven of the randomised controlled trials, and 25 out of 32 observational studies reviewed, found a significantly positive association between dairy intake and bone mineral content or density. By 2009, four additional randomised controlled trials had been conducted, and all of them reported positive relationships between dairy intake and bone mineral content or density. Most of the students in the current study were in their twenties, and had not yet reached peak bone density (at around 30 years).[35] Achieving an optimum peak bone density is considered to be one of the best ways in which to delay the onset of osteoporosis, particularly in women.[36] Eight out of 10 students consumed fewer than two servings of milk and dairy products per day. This may increase their risk of acquiring osteoporosis. Caffeine, associated with a high intake of coffee and tea, may further inhibit calcium absorption and increase urinary calcium excretion[37] in

some students. High protein consumption by most of the students could also contribute to increased urinary losses of calcium.[38] Furthermore, the majority of the students had a high intake of acid-forming foods, such as meat. Combined with a low intake of fruits and vegetables needed to produce a counteracting alkaline ash, this might result in a slightly low pH of the body fluids, which over time, slowly dissolve calcium from the bone crystal, thus further predisposing to osteoporosis.[38] Dairy intake is also inversely associated with blood pressure in many studies,[39] and it plays a role in weight management, although evidence is inconclusive in this regard.[40]

A large international survey, performed on 19 298 students in 23 countries, found that the prevalence of inactivity in leisure time at university and college averaged 23% in north-western Europe and the USA, 30% in Central and Eastern Europe, 39% in the Mediterranean, 42% in the Asia-Pacific countries, and 44% in developing countries, including South Africa.[41] By contrast, PALs were much higher in students in the current study. This may relate to very busy class and work schedules associated with the curricula of health sciences at the University of the Free State. However, the fact that less than a third of students made time for planned exercise is reason for concern. Studies identify time constraints as one of the most widely reported perceived barriers against exercise.[42] A study of 5 881 high school graduates found a significant decrease in exercise activity in the men in the sample and increases in other risk behaviour, including cigarette smoking and alcohol use.[41] Graduation from university, starting a career and marrying and starting a family are also major life transitions which can further contribute to the trend of increasingly sedentary behaviour that is commonly observed with advancing age.[42]

Ten per cent of the students in this study were active current smokers. Cigarette smoking increases the oxidative burden in the body, and when combined with a low intake of antioxidants from fruit and vegetables, significantly enhances the risk of various NCDs, including CVD and cancer.[33] No information was gathered on the use of antioxidant supplements in this study, but the body of evidence shows that these supplements are not as effective as adequate fruit and vegetable intake in preventing NCDs.[32]

Recommendations

As the burden of NCDs is projected to rise in South Africa and other developing countries, as future healthcare professionals, these undergraduate students will be expected to play a key role in implementing health policies and delivering weight management programmes through close contact with patients and the public. However, studies indicate that being overweight or obese prevents healthcare professionals from discussing weight, diet and lifestyle issues with patients, and from using strategies to prevent obesity in patients.[13] Similarly, their own lifestyles in respect of exercise and smoking habits influence whether or not they counsel patients on these issues. This study found that approximately 20% of the students were overweight or obese, most lacked healthy eating habits, roughly 10% smoked and the majority did not make time for planned exercise. This may impact negatively on their efficacy as future healthcare professionals.

According to Covey,[43] habits develop at the intercept of knowledge, skill and desire (attitude). Studies have identified significant barriers that prevent healthcare workers from offering dietary support as lack of nutrition knowledge and confidence on the part of the provider.[44,45] Therefore, tertiary institutions should critically appraise the training that is offered to students enrolled on health profession courses on nutrition and lifestyle. Knowledge is not necessarily enough to motivate healthcare professionals to practise what they (should) preach. To empower future healthcare professionals to take charge of their own health, an environment that supports healthy eating habits and an active lifestyle, and that discourages smoking and drinking, should be provided at campus level. Furthermore, as part of the course work, students in health care could be required to show that they are competent at applying these principles in their own lives. This, may, in turn, contribute to their confidence and efficacy in dealing with nutrition, health and weight issues when interacting with their patients. Research is needed to identify the most appropriate ways in which to create such structures for the multicultural student population in South Africa.

Conclusion

In this study, one in five undergraduate students studying for a career as a healthcare professional was overweight or obese. Most had poor eating habits, with a low vegetable, fruit and dairy intake, and a high meat, sugar and fat intake. One in 10 smoked. Most of them made no attempt at regular planned exercise. As habits are difficult to alter, this may put them at risk of acquiring NCDs, particularly later on in life, and could impact negatively on their efficacy as health ambassadors to the public.

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