Influence of biomedical education on health and eating habits of university students in Spain.

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ABSTRACT

Objective: This study explores the influence of enrolled degree course on health and eating habits in a population of Spanish university students (17–26 years).

Research Methods & Procedures: A cross-sectional observational study was carried out on a population of 648 students at a Spanish university. Volunteers were stratified into biomedical (medicine and nursing, 48%) and non-biomedical students (other fields of study, 52%). Data were collected using previously self-reported questionnaires focused on anthropometric and sociodemographic profile, lifestyle practices, body image perception, health consciousness, eating habits, physical activity and food addiction. Mann-Whitney U tests and Pearson's Chi-squared tests were applied to identify associations between two groups.

Results: Self-reported BMI was higher for the non-biomedical group ($p<0.05$), which also reported less regularity in taking meals ($p<0.05$), eating fewer coloured vegetables and fruits ($p<0.001$) and higher alcohol intake ($p<0.001$). In contrast, the proportion of students that showed more interest in the diet-health duality ($p<0.001$) and a desire to adopt healthier habits ($p<0.05$) was larger in the biomedical group. Dietary habits, obtained by means of an FFQ, suggested that biomedical students make healthier food choices. In addition, the group of biomedical students took a larger number of walks per week ($p<0.05$).

Conclusions: Healthier lifestyle factors cluster into the biomedical group in each of the various components of our study, except for food addiction where no differences were observed. The data presented here show a clear necessity to develop health promotion strategies targeting university students.

Keywords:

Dietary habits
Food addiction
Healthy eating
Lifestyle factors
Self-reported questionnaires
University students

INTRODUCTION

Obesity and other nutrition-related non-communicable diseases are increasingly becoming major health problems worldwide, particularly in European countries [1]. For example, the global obesity epidemic is linked to increased risks of some types of cancer, cardiovascular diseases, and type 2 diabetes mellitus [1, 2]. Studies conducted in Spain have shown that childhood obesity is increasing (prevalence of 10.3% in young children aged between 2 and 17 years), and that a considerable proportion of adults are obese (17.4% overall; 18.2% vs 16.7%, for males and females, respectively) or overweight (37.1%; 44.3% vs 30%, for males and females, respectively), with socioeconomic factors having a clear influence [3]. Although a healthy diet improves quality of life and helps prevent various non-communicable diseases, in recent years the composition of the Spanish diet has moved away from the healthy dietary pattern known as the "Mediterranean diet" [4]. Although there is no *single* Mediterranean diet [5], common aspects of this healthy dietary pattern include high consumption of fruits, vegetables, legumes and grains, olive oil as the main fat, moderate amounts of dairy products and fish, and low quantities of meat and meat products [6]. Recent cross-sectional studies in Spain indicate that while energy intake is decreasing, diet characteristics are drifting further from nutritional recommendations; for example, there is a tendency toward increasing consumption of meat and meat products as the main sources of protein [7, 8], an eating pattern which has previously been described as "Western*"* [9, 10].

Aside from the cardiovascular, metabolic and cancer risks associated with obesity, it appears that it can also lead to significant behavioural disturbances in patients. In fact, there is a growing body of evidence to support the idea that certain foods are addictive, and that food addiction is frequently present in overweight or obese people. The neurobiology of human addiction is far from fully understood, but certainly involves the dysregulation of mesolimbic dopaminergic pathways and alteration of reward and reinforcement mechanisms [11]. Highly palatable and high-calorie foods activate these pathways in a way that closely resembles the effect of drugs of abuse, hence these foods have been suggested to have the potential to trigger addiction-like eating [12, 13]. Food addiction has thus been proposed as a separate psychiatric condition with similar criteria to those of substance use disorders. It is, however, still a controversial concept [10, 14] and was not included in the latest edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-V).

University students are particularly vulnerable to nutritional disturbances due to the great changes that these young adults undergo during their years at university in terms of both physical and social development. In addition, university students are exposed to several factors such as stress, lack of time, changes in living arrangements, etc., that make them less likely to maintain a healthy lifestyle [15, 16]. Although these factors are commonly linked to a poor diet, more sedentary lifestyle and lack of physical activity, little is known about the aspects which may prevent university students following a healthy lifestyle. While the underlying causes are not yet well understood, previous studies have repeatedly shown the prevalence of unhealthy dietary habits (e.g. skipping meals, eating fast food and low fruit consumption) among college students. As the university years represent a critical period for the development of future (un)healthy habits which influence future health status, encouraging the adoption of healthy lifestyles by

university students is an important objective for educators developing health education programmes [17, 18].

The University of Castilla-La Mancha (UCLM) is located in central Spain and has several distinctive features with respect to other Spanish universities. For example, it has six campuses distributed across four different provinces and covering a total surface area of 79463 km^2, far greater than the mean area covered by other universities in Spain. The main objective of the present study was to determine the influence of students' degree subjects on their health habits and eating behaviour. To this end, we examined anthropometric and sociodemographic factors, body mass index (BMI), lifestyle practices, body shape perception, health consciousness, eating habits, physical activity and food addiction in our sample of students. We tested the hypothesis that the field of knowledge of a given degree could be a key factor in encouraging healthy lifestyles among university students and could be a key determinant to promote healthy lifestyles in young adults.

MATERIALS AND METHODS

Study design and sample.

A cross-sectional observational study was conducted at UCLM between June and September 2017. A total of 648 students from the six campuses of the university (Albacete, Almadén, Ciudad Real, Cuenca, Talavera de la Reina and Toledo), between 17 and 26 years of age and representing both sexes, participated in the study after having given informed consent.

For the analysis of the data, participants were divided into two groups; students undertaking a biomedical degree (medicine and nursing, n=312) and students enrolled in a non-biomedical degree (education, law, business administration and management, economics, architecture, environmental sciences, humanities, language and literature, engineering, chemistry, labour relations, food science and technology, history, physical activity and sport sciences, social work, social education, speech therapy, journalism, art history, human resources development and occupational therapy; n = 336).

Data collection.

Students completed a self-reported questionnaire available through a secure virtual platform. The UCLM students were recruited through social networks and provided with a hyperlink to the questionnaire. Participation in the study was voluntary and students received information about the goals of the study and data protection regulations.

The questionnaire used was specifically designed for this work based on previous validated studies, and comprised five sections:

1. Anthropometric and sociodemographic characteristics: included 8 questions about sex, date of birth, self-reported height and weight, university campus, university degree, current course and housing [19]. The body mass index (BMI) of the participants was calculated to classify them according to World Health Organization criteria as underweight (BMI < 18.5), normoweight (18.5 < BMI < 24.99), overweight (24.99 < BMI < 29.99) or obese (BMI > 30).
2. Lifestyle practices and health consciousness: this section included 11 questions regarding eating, drinking and smoking habits, and four questions related to body image and health consciousness [20–22].
3. Dietary habits: a food frequency questionnaire (FFQ), a short version of the European Health Survey 2014 [23], was used to measure the daily intake of 15 foods (fruits, vegetables or sugar-sweetened beverages).
4. Physical activity: this section contained 7 questions about physical activity habits and activity levels, selected from the short form of the International Physical Activity Questionnaire, [24]. This tool was designed to monitor physical activity in young and middle-aged adults.
5. Food addiction: this section used the mYFAS 2.0 questionnaire (an abridged version of the YFAS 2.0 scale, based on the DSM-V substance abuse criteria). It comprised 13 items that qualified food addiction as absent, mild, moderate or severe [25].

Ethics statement.

In accordance with Declaration of Helsinki guidelines, subjects were informed of the objectives of the study, as well as its anonymous, voluntary and non-profit nature. The study was approved by the Research Ethics Committee of the Hospital Complex of Toledo (Spain). Only the researchers involved in the study had access to the collected data.

Statistical data analysis.

After subjects had been recruited, the software package R (version 3.6.1 for Windows) was used to analyse the data statistically and summarise it in graphical representations, taking $p<0.05$ (95% CI) as the threshold for statistical significance. Qualitative variables were expressed as percentages and quantitative variables were presented as mean ± SEM.

The Kolmogorov-Smirnov test was used to assess the normality of the quantitative variables. Where the data did not fit to normality, the nonparametric Mann–Whitney U test was applied. For qualitative variables, Pearson's Chi-squared test was used. Although the statistical analysis was carried out on the complete set of data for each category, to facilitate the representation of the data and their understanding, the responses obtained have been grouped according to various criteria, as specified in the figure captions.

RESULTS

Characteristics of the sample and BMI categories.

The general characteristics of the sample are presented in Table 1. The final sample comprised 648 participants (35% male, 65% female), who were assigned to the biomedical (n=312) or non-biomedical (n=336) group, according to their course of study. The mean age of the total sample population was 21.5 ± 2.9 years, and the calculated BMI was 22.5 ± 4.2 (kg/m^2), classified as normal. The distribution by course was homogeneous, but a greater proportion of biomedical students were in their final years. In terms of housing type, the most commonly chosen options were living in a shared apartment (46.8%) or with family (37.3%). There was no difference in mean age between groups, but the average self-reported weight and height were statistically different for the biomedical and the non-biomedical group, both parameters being higher for the non-biomedical students. Calculated BMI was higher for the non-biomedical group (23.0 ± 5.0 versus 22.1 ± 3.1), with 14.9% and 6% of the non-biomedical students categorised as overweight or obese, respectively, while 11.2% and 2.2% of the biomedical students were classified as overweight or obese, respectively. Of the total sample, 77.2% of the biomedical students and 69.6% of non-biomedical students had a BMI classified as normal. Of the remaining students, 9.3% of biomedical students and 9.5% of non-biomedical students were categorised as underweight.

	Total (n=648)	**Biomedical (n=312)**	**Non-biomedical (n=336)**	**p-value**
Population (% subjects)	100	48.1	51.9	-
Sex (% female)	65	54,5	76,3	**<0.001**
Age (years)	21.5 ± 2.9	21.4 ± 2.3	21.6 ± 3.3	0.559
Weight (Kg)	64.1 ± 12.9	61.9 ± 11.3	66.1 ± 13.9	**<0.001**
Height (cm)	168.5 ± 10.4	167.2 ± 8.8	169.8 ± 11.6	**<0.001**
BMI (kg/m^2)	22.5 ± 4.2	22.1 ± 3.1	23.0 ± 5.0	**0.034**
BMI (% subjects)				**0.049**
Underweight	9.4	9.3	9.5	
Normal range	73.3	77.2	69.6	
Overweight	13.1	11.2	14.9	
Obese	4.1	2.2	6.0	
University level (% subjects)				**<0.001**

	Total (n=648)	Biomedical (n=312)	Non-biomedical (n=336)	p-value
First year	25.6	21.8	29.2	
Second year	17.7	15.4	19.9	
Third year	19.1	16.7	21.4	
Fourth year	25.0	23.1	26.8	
Fifth year	8.2	14.4	2.4	
Sixth year	4.3	8.7	0.3	
Type of housing (% subjects)				0.205
Family dwelling	37.3	39.4	35.4	
University residence	14.7	16.7	12.8	
Shared apartment	46.8	42.9	50.3	
Alone	1.2	1.0	1.5	
Vigorous activity (% subjects)	62.2	60.9	63.4	0.518
Times per week (days)	3.0 ± 1.7	2.9 ± 1.7	3.1 ± 1.8	0.128
Time per session (min)	55.1 ± 31.34	51.7 ± 25.9	58.1 ± 35.2	0.230
Moderate activity (% subjects)	65.6	65.1	66.1	0.804
Times per week (days)	3.0 ± 1.8	3.0 ± 1.8	3.0 ± 1.9	0.807
Time per session (min)	49.7 ± 34.2	49.4 ± 33.3	50.0 ± 35.1	0.694
Walk at least 10 minutes (% subjects)	96.9	97.8	96.1	0.262
Times per week (days)	5.6 ± 1.9	5.8 ± 1.8	5.5 ± 1.9	**0.048**
Time per session (min)	45.7 ± 32.6	47.1 ± 31.4	44.4 ± 33.6	0.058

	Total (n=648)	Biomedical (n=312)	Non-biomedical (n=336)	p-value
Sitting time per day (hours)	6.0 ± 3.0	6.0 ± 3.0	6.1 ± 3.0	0.695
Food addiction (% subjects)	3.5	3.8	3.3	0.832
Mild	0.9	0.6	1.2	
Subdued	0.8	1.0	0.6	
Severe	0.9	1.0	0.9	

Table 1. Anthropometric characteristics; physical activity level and food addiction of Spanish university students participating in this study (n=648). The short format of the International Physical Activity Questionnaire was used to study the characteristics of the students' participation in physical activity. The presence of food addiction was identified by means of the mYFAS Scale. Results are expressed as percentages or as mean ± SEM when indicated. P-values are marked in bold if $p<0.05$. The significance of differences between biomedical and non-biomedical students was determined by U Mann–Whitney (for quantitative variables) or by Pearson's Chi-square analyses (qualitative variables). BMI: Body Mass Index.

Lifestyle practices.

Most of the student sample (93%) reported taking meals regularly, and 55.4% reported eating daily with friends or family. Only 13.7% of students reported eating snacks once a day. In addition, the study participants indicated they consumed coloured vegetables (26.4%) and fruits (47.4%) daily. A large proportion of the sample reported that they rarely drank alcohol (72.8%) and never smoked (80.6%). Finally, 89.2% of students were aware of the concept of nutritionally balanced food (Supplementary Table 1). When comparing biomedical and non-biomedical students, as shown in Figure 1, differences were found in terms of the regularity of eating. Non-biomedical students reported taking meals, including breakfast, less regularly in. In addition, non-biomedical students reported eating less coloured vegetables and fruits daily than biomedical students; while 33% of biomedical students reported eating coloured vegetables every day and 57.4% eating fruits daily, only 20.2% of non-biomedical students consumed coloured vegetables on a daily basis, and 38.1% ate fruit every day. In terms of alcohol consumption, biomedical students reported drinking less alcohol than non-biomedical students. However, there were no differences between groups when comparing the number of meals per day, the number of times that the students ate snacks or fried food, the frequency of eating with friends and family, smoking habits or nutritional knowledge.

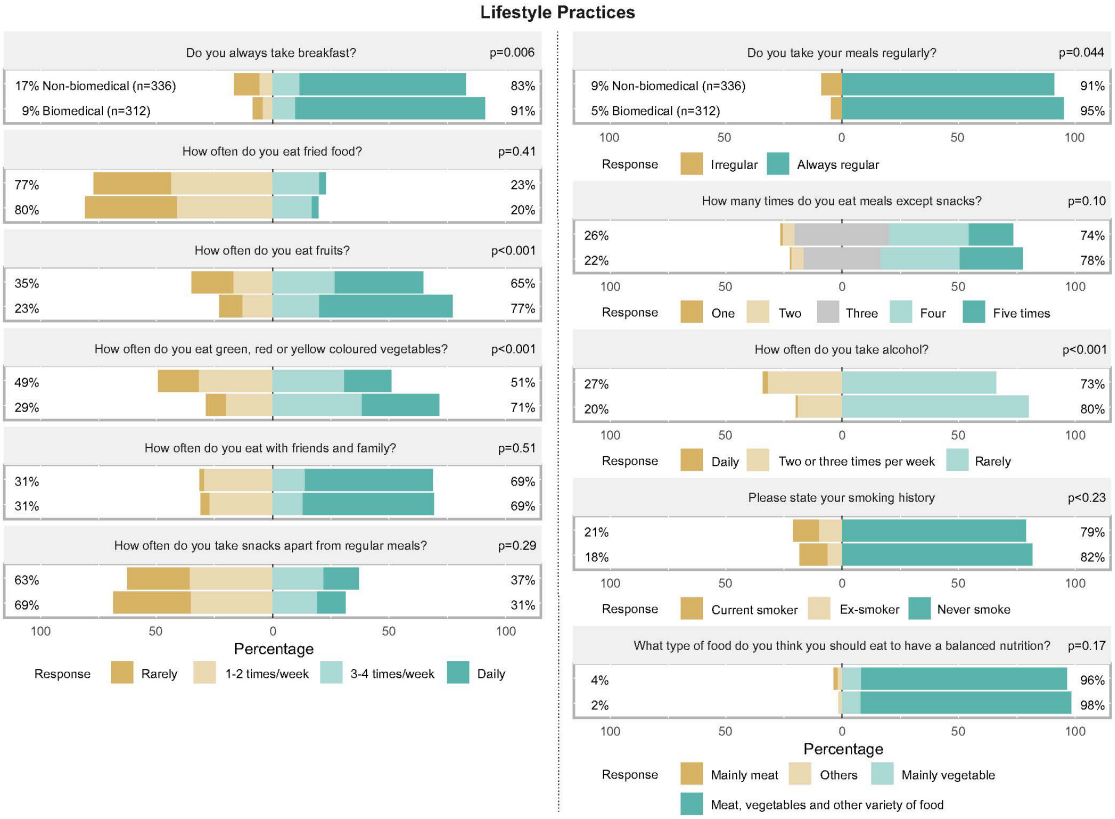
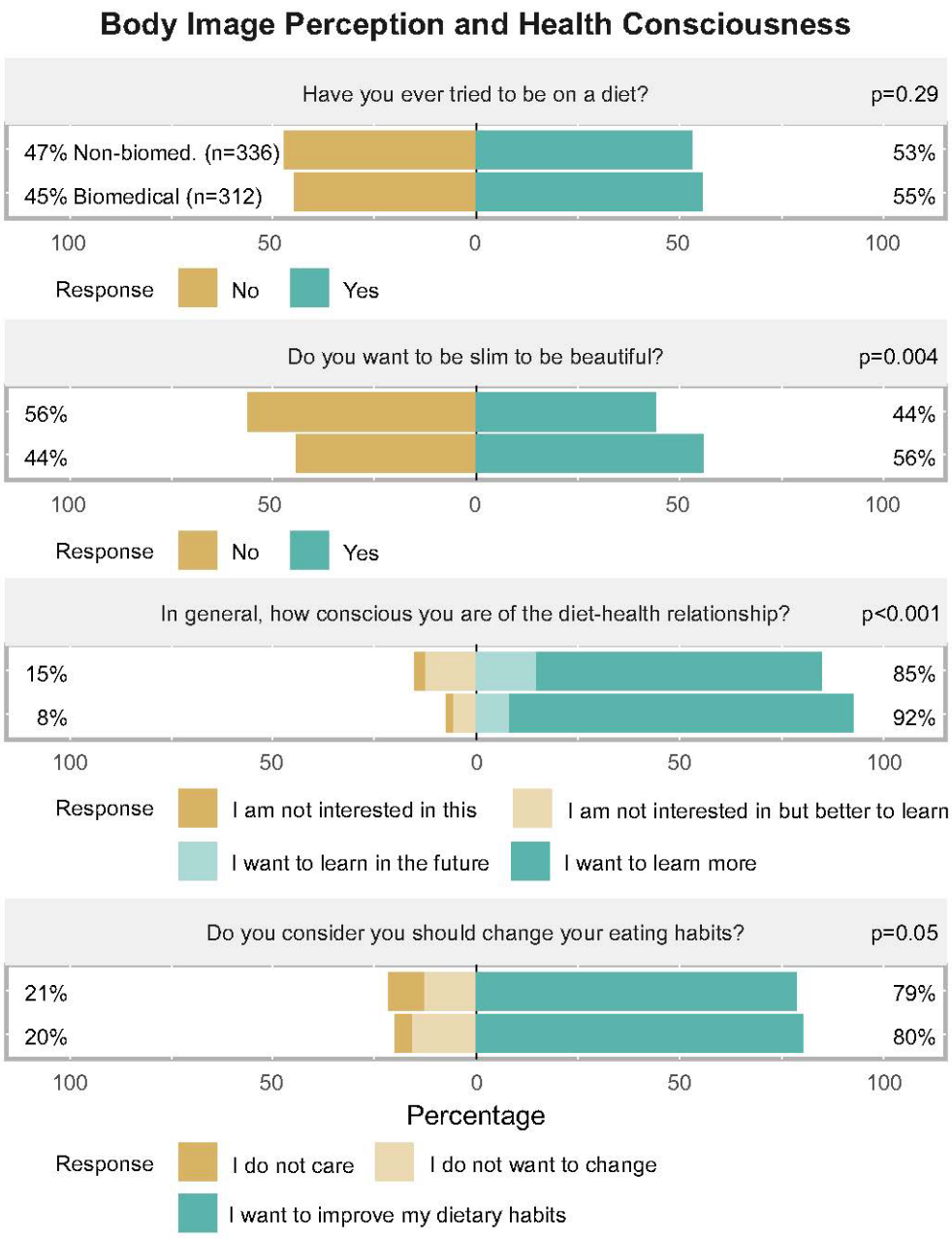


Figure 1. Lifestyle practices of biomedical and non-biomedical university students participating in this study (n=648). Responses to questions related to eating habits are expressed as percentages. Answers to frequency questions have been grouped as high (green tones) and low (yellow tones) consumption. For the rest of the questions, where possible, green tones have been used to group the healthiest answers, with yellow tones for the less healthy ones. Behavioural differences between groups were identified by applying Chi-square analyses.

Body image and health consciousness.

More than half (54.2%) of the sample population stated that they had tried following a diet, while 49.7% said they wanted to be slim to be beautiful. With regard to consciousness about the relationship between health and diet, 76.9% of the sample population declared an interest in increasing their knowledge about the relationship between diet and health, while 79.3% of participants were interested in improving their dietary habits (Supplementary Table 2). The comparison between the two groups is shown in Figure 2. Although no differences were found between biomedical and non-biomedical students in terms of their history of dieting, the proportion of biomedical students (55.8%) declaring that they wanted to be slim to be beautiful was higher than non-biomedical students (44%). Biomedical students also showed more interest in learning about the diet–health relationship (92%) compared to non-biomedical students (84.9%). Finally, biomedical students showed more desire to adopt healthier dietary habits in comparison to non-biomedical students.



245

percentages. Where possible, green tones have been used to group the healthiest answers, with yellow tones for the less healthy ones. Behavioural differences between groups were identified by applying Chi-square analyses.

250 **Food consumption.**

As already alluded to, students responding to the FFQ reported a high consumption of the items "fresh fruits" and "vegetables and salads" (daily consumption: 53% and 36%, respectively). Nevertheless, consumption of other healthy items was not so commonly reported. For example,

67.4% of the sample only consumed legumes between 1 and 3 times a week, and 31.3% of participants ate sweets daily (Supplementary Table 3). When comparing the two groups, as shown in Figure 3, the differences found suggest that biomedical students make *healthier* food choices. For instance, biomedical students reported consuming "fresh fruits" (74% vs 61%) and "vegetables and salads" (69% vs 54%) more often than non-biomedical students, but also reported a higher consumption of unsweetened cereals (87% vs 79%), fish (22% vs 22%) and dairy products (92% vs 83%), and a less frequent consumption of "sausages and cold meats" (31% vs 41%), "soft drinks with sugar" (18% vs 29%) and "fast food" (14% vs 14%).

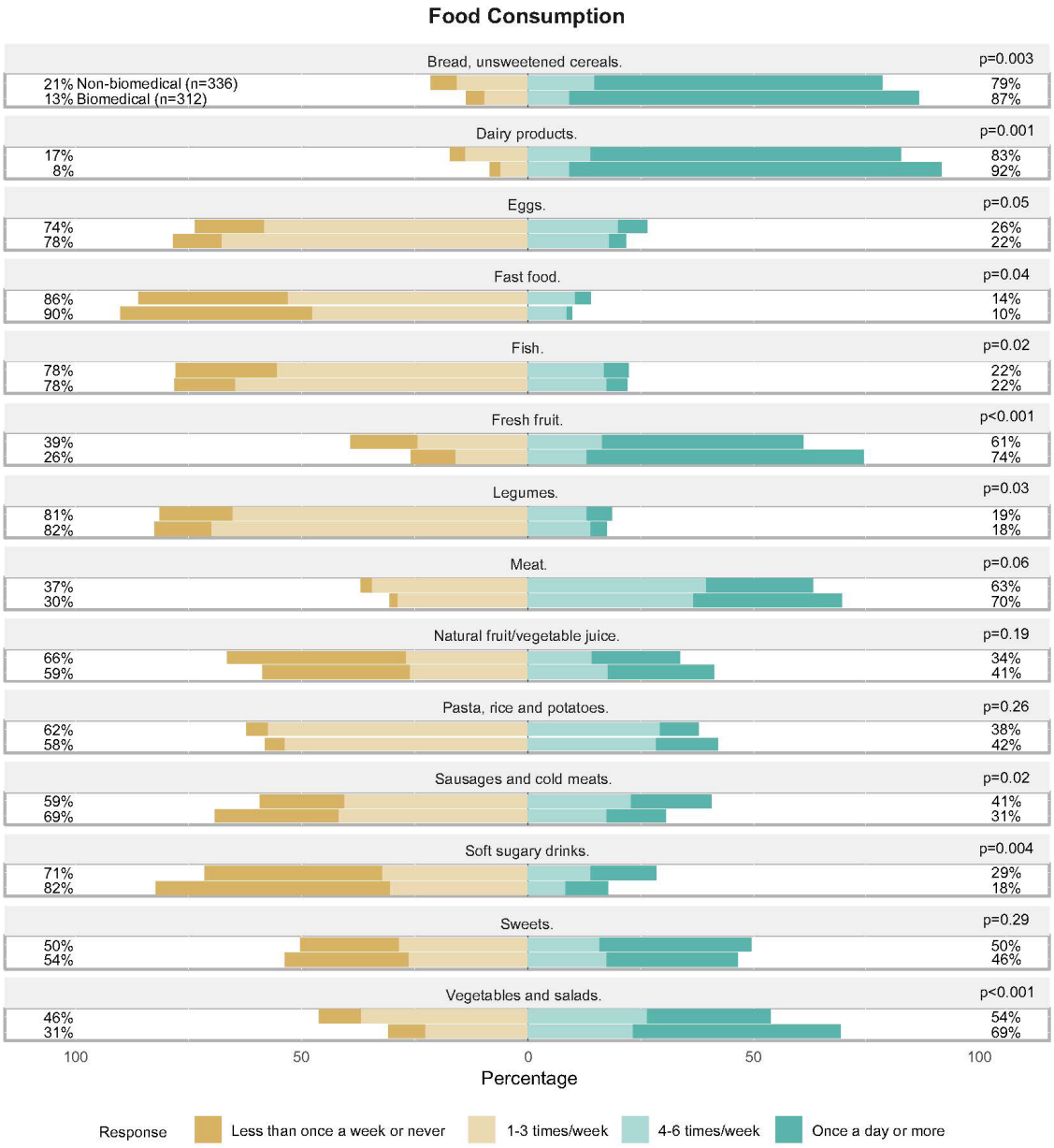


Figure 3. Comparison of food consumption frequency between biomedical and non-biomedical university students participating in this study (n=648). Average intake of food groups is shown

as percentage. Answers have been grouped according to frequency of intake into high (green tones: *Once a day or more*, *4-6 times/week*) or low (yellow tones: *Less than once a week or never*, *1-3 times/week*) consumption. Behavioural differences between groups were identified by applying Chi-square analyses.

Physical activity habits.

Table 1 shows the results obtained for physical activity habits and activity levels in our sample. Taking the sample as a whole, 62.2% performed vigorous activity during the week (3.0 ± 1.7 times per week), while 65.6% of participants also undertook moderate activity during the week (3.0 ± 1.8 times per week). Finally, a vast majority of participants (96.9%) reported walking at least 10 minutes 5.6 ± 1.9 days per week. Statistically significant differences between groups were only found in the number of times that the participants walked for at least 10 minutes, with the number of times that biomedical students walked per week slightly higher than that for non-biomedical students.

Food addiction.

Seventeen participants (3.5% of the sample) met the criteria for food addiction according to the mYFAS 2.0 questionnaire; 8 of these belonged to the biomedical group and the remaining 9 to the non-biomedical (Table 1). Additional analysis was performed in order to further understand the characteristics of the participants addicted to food. No significant differences were found in any component of our study when comparing the food-addicted biomedical students (n=8) with non-biomedical food addicts (n=9). A comparison between addicts and non-addicts was made in order to better characterise these subjects. No significant differences were found, other than that the average time spent sitting per day was higher (p=0.004) for non-biomedical food addicts (9.0 ± 1.1 hours/day) than for biomedical food addicts (5.1 ± 0.7 hours/day) (data not shown).

DISCUSSION

This study characterised the anthropometric and sociodemographic profiles, lifestyle practices, body image perception, health consciousness, eating habits and food addiction of a representative sample of Spanish university students using self-reported questionnaires. Results obtained were comparatively analysed for students of biomedical and non-biomedical subjects. In addition to sample characterisation, the reported data suggests that Spanish biomedical students lead healthier lifestyles than non-biomedical students. Although non-biomedical students did not report particularly worrying unhealthy habits (e.g. most of them never smoke, and they are interested in improving their dietary habits), the overall results of this study recommend the adoption of health promotion programmes especially in non-biomedical degrees. To our knowledge, this is the first study of its kind, both in terms of the number of participants and its complexity, to be carried out on university students.

The dietary habits revealed here are similar to those reported in previous studies exploring the dietary habits and lifestyles of university students from countries in Europe and elsewhere, revealing that there is room for improvement [9, 26–30]. This is particularly important as many health-related behaviours are incorporated and developed during the period spent at university [18, 31]. University students are, therefore, important targets for health promotion strategies. The prevalence of overweight and obese participants in our sample does lie in the lower range of prevalence reported in other recent studies of Spanish university student populations [19, 26, 32], but could not be considered low from a health promotion point of view, as overweight and obesity are well-known risk factors for non-communicable diseases across diverse populations [33–35].

In addition, the diet of Spanish university students did not follow traditional Mediterranean habits. The Mediterranean diet is an eating pattern basically characterised by a high intake of complex carbohydrates and dietary fibre, and low consumption of undesirable nutrients. According to our results, the diets of Spanish university students present unsatisfactory levels of consumption of fruit, vegetables and legumes, with consumption of meat predominating over fish, and with undesirable levels of intake of sweets, fast food and fried foods. Our results are consistent with previous studies examining the dietary habits of Spanish university students [19, 26, 36], and clearly show that the traditional Mediterranean diet is being replaced by a *Western* eating pattern [37]. These results are significant if we bear in mind that quality of diet has been suggested to be a more significant contributor to obesity than low physical activity or high energy intake [38–40]; therefore, diet appears to be a major target to limit overweight in university years, and so to prevent subsequent obesity later in life [41].

As discussed in previous studies [9, 42], the nutritional knowledge of the participants (in our case, biomedical students) may result in better outcomes (i.e. healthier lifestyles) when considering the habits of a population. Although the possible bias of previous studies which included a proportion of participants with high nutritional knowledge have been mentioned in the literature, two important issues have not yet been fully analysed. First, if we want to know the habits of a specific population, the inclusion in any sample of participants with adequate/high nutritional knowledge will have an effect on our results (and, therefore, our conclusions), so caution should be used to ensure accurate conclusions are drawn, but

appropriate questions must also be asked to determine which part of our sample matches these criteria. Second, we have mentioned that some participants have certain nutritional knowledge (biomedical students) and therefore made more healthier choices but, in order to develop adequate educational programmes, further research is needed to identify the reasons that lead biomedical students to develop healthier lifestyles.. Consequently, to understand eating habits and dietary patterns in a population, the nutritional knowledge of that population must also be carefully examined.

In addition, although previous reports showed that Greek medical students presented unhealthy lifestyles [43] and that the food habits of Chinese medical students and health sciences students in the Middle East should be improved [20, 44, 45], recent reports on the quality of diet and lifestyle of Spanish university students have shown no dependence on their field of study [46] or even religious identity [32]. Nevertheless, in the study by Muñoz de Mier *et al*. [46], the assignment of the students to the biomedical or non-biomedical groups was made following a different rationale to our study (for example, pharmacy students were included in the biomedical group). Therefore, our work provides evidence for the importance of choosing the right criteria to distribute the students within the sample, emphasising the idea developed in this paper that students of biomedical subjects (i.e. medicine and nursing), which are more clearly linked to the health–nutrition dualism, seem to develop healthier lifestyles.

A decrease in physical activity level correlates with all-cause mortality in a dose-dependent manner [47]. In fact, the need to promote physical activity among university students in Spain to improve their lifestyles has been previously reported [19, 48], as insufficient physical activity may be related to an increase in sedentary lifestyles. Nevertheless, our sample reported good/acceptable levels of physical activity, in line with the minimum recommendations proposed by the WHO, i.e. 150 minutes of moderate activity or 75 minutes of vigorous activity per week [49], with no differences between biomedical and non-biomedical groups (see Table 1 for details). These results could be explained by the fact that, in contrast to other large cities in Spain, the university campuses where the present study was conducted are located in small cities where most of the students can walk to daily lectures and practical classes. This may lead these students to adopt a less sedentary behaviour, therefore, favour participation in physical activity [50].

Food addiction is still a very controversial concept and was not considered for inclusion in DSM-V [51]; even so, an increasing number of authors are currently applying YFAS questionnaires in their epidemiological studies to gain insight into addiction-like eating behaviour in specific situations. The vast majority of these works have been carried out on overweight/obese populations with very different characteristics to our sample, which mainly comprises normoweight subjects. However, there are some previous studies conducted with young, healthy populations closer to our conditions. According to these, the prevalence of food addiction in our study (3.5%) lies in the lower range of expected values. A meta-analysis performed by Pursey *et al.* [52] identified five studies where YFAS was applied to normoweight subjects and calculated a food addiction prevalence of 11.1%; this number referred to a wide range of ages, and a lower frequency (not specified by the authors for healthy individuals) was suggested for adults of less than 35 years of age. More recently, three remarkable studies have addressed the prevalence of food addiction in young people. A validation study of the YFAS 2.0

questionnaire in the Spanish population estimated a prevalence of 3.3% in healthy controls with a mean of 21 years of age, nearly all of them having completed secondary education [53]. Another work with undergraduate students from a Department of Nutrition and Dietetics in Greece found a similar prevalence of 4.5% [54]. Finally, Yu *et al.* [55] worked with a wide sample of college students at a midsize public university in the southeast United States and reported a prevalence of around 8%, with a marked effect of sex on food addiction (12.3% in females vs. 4.6% in males) that confirmed previous differences in this regard. To our knowledge, there has been no previous comparative study of the prevalence of food addiction in students of biomedical and non-biomedical university degrees, even though those studying health sciences have been suggested to exhibit more problematic eating behaviour [54]. In this context, we did not find marked differences either in the frequency of food addiction in the population, or in the main characteristics of addicted subjects, when comparing biomedical and non-biomedical students; this may be due to the low number of cases detected. Interestingly, food addiction was more closely related to low physical activity in non-biomedical students, which suggests it may be interesting to conduct further comparative studies accounting for the different dimensions of the YFAS scale to detect subtle changes in the nature of food addiction depending on the field of study of the participants.

Limitations:

There are a number of limitations to this study. The criterion used to assign students' ongoing studies to one or the other group was that in order to be included in the biomedical group, the degree not only had to include specific modules on nutrition and dietetics, but it should also cover specific information about the nutrition–health duality (e.g. as in endocrinology, epidemiology). Thus, some degrees included in the non-biomedical group, such as food science and technology, pharmacy, physiotherapy or physical activity and sport sciences, may also be regarded as biomedical subjects, but do not fit our inclusion criteria. In addition, due to the broad nature of the questionnaires used and the complexity of the study, the authors believe that this is a suitable criterion for analysing the data as a whole, although, of course, other breakdowns could also be of interest. Furthermore, this study could also be affected by other issues associated with questionnaire-based research in general [56]**.**

Differences between sexes might be one limitation, although the responses of men and women in each subgroup were compared and no significant differences were found. The difference in BMI between the biomedical and non-biomedical groups is a starting condition present in our sample and is representative of the population.

Future perspectives:

More studies are needed to shed light on the main differences between biomedical and non-biomedical students reported in this study, and the reasons why healthy habits seem to cluster in the former group specifically. In addition, there are systematic reviews of high scientific quality available in the literature for other areas (e.g. [57]) that demonstrate which interventions are the most appropriate if we want to change the habits of a population; it would be very interesting to have the same tools available for the university student population. Finally, establishments associated with the food industry (supermarkets, restaurants, fast food companies), as well as political and legislative authorities and the media should be more

concerned about the quality of products that consumers can buy and advocate for an increase in the promotion of healthy foods.

CONCLUSIONS

As previous studies focused on narrower geographic areas or smaller sample sizes, or provided poorer characterisation of the sample population, the present study provides valuable data characterising a representative sample of Spanish university students and is, to the best of our knowledge, the first work in which such a complex study of the anthropometric and sociodemographic profile, lifestyle practices, body image perception, health consciousness, eating habits and food addiction of Spanish university students is presented. In addition, the larger sample size analysed enabled us to draw distinctions between biomedical and non-biomedical students. We were able to determine that healthier lifestyle factors cluster into biomedical students' lifestyles, although neither group reported an adequate adherence to the Mediterranean diet. Therefore, these data present evidence of the clear need to develop health promotion strategies directed at university students.

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