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RESEARCH

Differences in lifestyles according to alcohol consumption in university students: Longitudinal study

Diferencias en estilos de vida según el consumo de alcohol en universitarios: estudio longitudinal

Diferenças nos estilos de vida de acordo com o consumo de álcool em estudantes universitários: estudo longitudinal

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Abstract

Introduction: Sedentary lifestyles without nutritional control that also include regular alcohol consumption could increase the health risks in university population. **Objective:** Analyze the differences in lifestyles with respect to the regular intake of nutrients, energy consumption and physical activity according to alcohol consumption in university students. **Methodology:** Descriptive, correlational, and longitudinal study with two measurements in a sample of 67 students from the health area (2017 and 2020). Current university students who voluntarily agreed to participate were included. A personal data card, the 24-hour multi-step reminder, the International Physical Activity Questionnaire were applied, and body composition was measured. Inferential analyzes with correlation tests, Mann Whitney U and Wilcoxon test were also implemented. **Results:** 54.2% of women and 73.7% of men were reported as current alcohol consumers. Differences were observed regarding total energy consumption and carbohydrate intake between those who drink and those who did not drink alcohol (p <.05). In both groups, protein consumption was associated to lipid intake (p <.01). Between measurements, differences were found regarding body mass index, total caloric consumption, and total energy consumption (p <.03). **Conclusion:** In this sample, alcohol consumption led to differences regarding greater body composition, caloric consumption, and energy consumption, which may influence a greater possibility of overweight in university students.

Key words: Dieting behavior, Obesity; Student Health Services; Alcohol Drinking in College; Habits (DeCS).

Resumen

Introducción: Estilos de vida sedentarios, sin control nutricional y consumo de alcohol habitual podrían estar incrementando los riesgos a la salud en población universitaria. **Objetivo:** Analizar las diferencias en estilos de vida al respecto de la ingesta habitual de nutrimentos, gasto energético y actividad física de acuerdo con el consumo de alcohol en universitarios. **Metodología:** Estudio descriptivo, correlacional, longitudinal con dos mediciones en una muestra de 67 estudiantes del área de la salud en 2017 y 2020. Se incluyó estudiantes vigentes de la universidad que aceptaran participar de manera voluntaria. Se aplicó cédula de datos personales, el recordatorio de 24 horas de pasos múltiples, el Cuestionario Internacional de Actividad Física y se midió la composición corporal. Análisis inferenciales con pruebas de correlación, U de Mann Whitney y prueba de Wilcoxon. **Resultados:** El 54.2 % de las mujeres y 73.7 % de los hombres refirieron consumir alcohol actualmente. Hubo diferencias estadísticas en gasto energético total y la ingesta de carbohidratos entre los que consumen y no consumen alcohol con p< 05. En ambos grupos el consumo de proteínas se asoció con la ingesta de lípidos con p<.01. Entre mediciones, se encontraron diferencias estadísticas con índice de masa corporal, el consumo calórico total y el gasto energético total con p< 03. **Conclusiones:** En esta muestra el consumo de alcohol propició diferencias al respecto de mayor composición corporal, consumo calórico y gasto energético lo que puede incidir en mayor posibilidad de exceso de peso en universitarios.

Palabras clave: Conducta alimentaria; Obesidad; Servicios de salud para estudiantes; Consumo de alcohol en la universidad; Hábitos (DeCS).

Abstrato

Introdução: Estilos de vida sedentários, sem controle nutricional e consumo regular de álcool podem estar aumentando os riscos à saúde da população universitária. **Objetivo:** Analisar as diferenças nos estilos de vida quanto à ingestão regular de nutrientes, gasto energético e atividade física de acordo com o consumo de álcool em universitários. **Metodologia**: Estudo longitudinal, descritivo-correlacional com duas medidas em uma amostra de 67 estudantes da área da saúde em 2017 e 2020. Foram incluídos estudantes universitários atuais que aceitaram participar voluntariamente. Cartão de dados pessoais, recordatório de

24 horas de múltiplos passos, Questionário Internacional de Atividade Física e composição corporal foram medidos. Foram também implementadas análises inferenciais com testes de correlação, Mann Whitney U e Wilcoxon test. **Resultados:** 54,2% das mulheres e 73,7% dos homens relataram consumir álcool atualmente. Houve diferenças estatísticas no gasto energético total e ingestão de carboidratos entre aqueles que consomem e não consomem álcool com (p<0,05). Em ambos os grupos, a ingestão de proteínas foi associada à ingestão de lipídios com (p<0,01). Entre as medidas, foram encontradas diferenças estatísticas com índice de massa corporal, ingestão calórica total e gasto energético total com p < 03). **Conclusões:** Nesta amostra, o consumo de álcool levou a diferenças em relação a uma maior composição corporal, consumo calórico e consumo de energia, o que pode influenciar uma maior possibilidade de excesso de peso nos estudantes universitários.

Palavras-chave: Comportamento Alimentar; Obesidade; Serviços de Saúde para Estudantes; Consumo de Álcool na Faculdade; Hábitos (DeCS).

Introduction

In 1999 the World Health Organization pointed out that a healthy lifestyle refers to the way of life in which the risk of being seriously injured or dying early is reduced [(1)]. In 2018, a study reported that the majority of university students in the health area did not identify the relationship of lifestyles with health or risk factors [(2)]. This data is worrisome and may be a reflection of sociocultural patterns that explain the persistence of unhealthy habits despite the dissemination of proper information in the country. Conditions such as obesity are a result of poor lifestyles and have been considered a national pandemic in Mexico since 2016 [(3)]. Starting in 2020, the COVID-19 pandemic increased the alert status of the health system due to the greater vulnerability of overweight people to the infectious disease. In university students from the city of Hermosillo, Sonora in Mexico, the prevalence of lifestyles with high levels of sedentary lifestyle and abusive alcohol consumption or other substances was reported [(4-5)]. Consumption of alcoholic drinks is usually associated with parties, meetings, food consumption and even as an escape door from stress through a moment of relaxation; additionally, it has been explained that it contributes to develop excess weight [(6-7)] and that, in addition, it is directly related to physical inactivity and the presence of greater cardiovascular risk [(8)].

The health plenitude traditionally characteristic of young people becomes uncertain in the face of lifestyles that increase risk factors for diseases that directly affect life quality. University context favors the

independence and personal spontaneity of its members; however, maybe not all of them are prepared to act appropriately against the development of harmful habits [9]. According to a report by Cruz-Rodríguez, et al., considering the vulnerability of university students due to their predisposition to skip meals and adequate food intake, it is necessary to implement facilitating strategies so that university students can acquire a healthy eating lifestyle and physical activity (PA by its acronym in English) [10]. Hence, the assessment and control of changes in body composition are part of a strategy for promoting health among the student population. The timely identification of cardiovascular risk factors is pertinent in all life stages, nursing staff can influence the promotion of self-care and prevention of health risks for young people.

Most analyzes of variables of interest in this project have not considered the nutritional intake detail and have used cross-sectional research approaches. As an additional analysis, it was proposed to estimate the influence of time by using a two-level longitudinal analysis. The research objective was to analyze the differences in lifestyles regarding the regular nutrient intake, energy consumption and PA according to alcohol consumption in university students.

Methodology

Descriptive, longitudinal correlational design study with two measurements in a non-probabilistic convenience sample of university students affiliated to an academic nutrition unit in Hermosillo, Sonora, Mexico. From the retrospective analysis of the personal file of a population of 160 participants from a previous research study, the changes in the variables of interest were estimated with respect to an assessment carried out in 2017. Current and available students of the university were included who agreed to voluntarily participate in a study that involved answering a questionnaire and measuring their body composition. Incomplete data was removed. Identification data including gender, age, alcohol use, and current tobacco use of the participants were recorded. Alcohol consumption and tobacco use during the last month was asked with an open dichotomous question (positive, negative). Nutritional macronutrient intake was estimated using the R24H Multi-Step 24-Hour Reminder. It is a retrospective method that consists

of questioning the subject about everything he ingested the day before, that is, solids and liquids. It helps to determine food, energy, and nutrient intake [11]. The application time ranged between 20 and 30 minutes; the interviewer asked about the characteristics of food and beverages consumed, such as the method of preparation, trade name, and ingredients used. During the application of this questionnaire, food models and food composition tables [12] were used to estimate the amount in grams. It has been reported that this questionnaire is a tool that, appropriately applied, is useful for the assessment of dietary intake at population level through individual questionnaires [13-14].

PA was considered by estimating the metabolic equivalent unit (METs) with the short version of seven questions of the Spanish version of the International Physical Activity Questionnaire identified as *Cuestionario Internacional de Actividad Física* [15]. Its validity and reliability have been appropriate in Mexican adults regarding the evaluation with accelerometry with correlations in a range of .74 to .89 (16). During a pilot test in a small subsample, the test-retest reliability of this questionnaire was reviewed with acceptable values (α=.81).

Body composition included measurement of height, waist circumference (WC), and body weight, following the international standards of the International Society for the Advancement of Kinanthropometry (ISAK). Electrical bioimpedance was measured with the Body Scan Plus II® multifrequency analyzer (Jawson Medical brand, Korea, 2008) and body mass index (BMI) was estimated by dividing weight by the square of height. Measurements were taken in the morning, fasting for four hours, without having performed strenuous PA in the last 12 hours, with bladder emptying prior to measurement, and wearing light clothing.

Authorization was obtained from the University and the Research Coordination of the Faculty of Sports Organization of the University (REPRIN-FOD-61). Students were called to participate in the Nutritional Care Center following security measures to comply with the Helsinki Declaration guidelines.

The Statistical Package for Social Science (SPSS) version 21.0® program was used. Analyzes are presented with mean and standard deviation, or with percentages. A description of the complete sample is presented

and a comparison is made between those who drink and do not drink alcohol drinks during the second measurement. An alpha value of .05 was considered. Inferential analyzes were performed considering the distribution of data with Mann-Whitney U tests, Spearman and Wilcoxon correlation tests.

Results

Participants were on average 21.6 years old (SD=1.0). In relation to current alcohol consumption, 54.2% of women and 73.7% of men drank alcohol. From those who did it, 22.5% also smoked and 47.5% were overweight. While among those who did not drink alcohol, only 2.7% of them were reported as smokers, and 40.5% were overweight (Table 1).

Table 1. Descriptive characteristics of participants of the complete sample and by current alcohol consumption, 2020. (n=67).

Variable	All (n = 67)		SAC (n=27)		WAC (n=40)				NAC-WAC
	Mean	SD	Mean	SD	Z	Mean	SD	Z	P
Age, years	21.6	1.0	21.5	0.7	.00	21. 7	1.2	.00	.92
Weight, kg	69.3	20.5	63.8	14.9	.20	73.0	22.9	.01	.07
Height, cm	163.8	9.1	161.9	8.4	.20	165.1	9.4	.20	.17
BMI, kg/m2	25.6	5.7	24.2	4. 7	.09	26.5	6. 3	.00	.11
Waist, cm	80.9	13.6	81.7	16.3	.69	80. 5	11.6	.76	.23
BF, %	26.6	6.6	26.7	6. 3	.09	26. 6	6. 9	.20	.96
TEC, cal	2060.9	606.9	1770. 9	314. 2	.20	2256. 7	678. 2	.02	.00
Consumption, cal	2289.9	1012.2	2380. 2	1412.4	.00	2228.9	628. 2	.04	.57
CH, gr	219.5	156.8	207.2	220. 3	.00	227.7	95.4	.20	.03
Protein, gr	100.8	53.2	106.3	64. 3	.00	97.0	44.8	.01	.91
Lipids, gr	92.6	36.9	91. 4	36.4	.20	93. 4	37.7	.10	.98
PA, METs	1856.9	1972.3	1352. 4	1274. 2	.02	2197.6	2281.5	.00	.38

Source: Own development

NAC= No alcohol consumption, WAC= With alcohol consumption, SD=standard deviation, Z=Kolmogorov-Smirnov with Lilliefors correction, BMI=body mass index. BF=body fat, TEC=total energy consumption, Cal=calories, PA=physical activity, METs=energy consumption units, CH=carbohydrates. *Differences were estimated using the Mann-Whitney U test, only the p value is presented.

Statistical significant differences were observed regarding TEC and carbohydrate intake between those who drank and did not drank alcohol, with higher values for those who did it.

Regarding students who consumed alcohol, the WC (waist circumference) was only associated with caloric ($p<.01$) and lipid ($p<.05$) consumption. Among those who did not consume alcohol, a direct statistically

significant association of BMI with caloric expenditure and TEC was observed, statistically significant inverse association between BMI and caloric intake ($p<.05$), and statistically significant indirect association between TEC and protein consumption ($p<.05$). In both groups, a positive association was observed between: TEC and PA, caloric intake and macronutrient intake, and, between protein consumption and lipid intake ($p<.01$), (Table 2).

Table 2. Spearman's correlation matrix between body composition, total energy consumption, caloric intake and physical activity according to the alcohol consumption of participants, 2020. (n=67).

	1	2	3	4	5	6	7	8
With alcohol consumption (n=40)								
1. BMI	1.000							
2. WC	.309	1.000						
3. BF	.223	.139	1.000					
4. TEC	.269	.065	-.275	1.000				
5. Caloric intake	-.091	.414**	-.028	-.290	1.000			
6. CH	-.022	.290	.247	-.213	.615**	1.000		
7. Protein	-.158	.263	.007	-.214	.493**	.194	1.000	
8. Lipids	-.066	.314*	-.107	-.153	.603**	.259	.470**	1.000
9. PA	.067	-.062	-.357*	.729**	-.240	-.156	.006	-.072
No alcohol consumption (n=27)								
1. BMI	1.000							
2. WC	-.235	1.000						
3. BF	.459*	.022	1.000					
4. TEC	.436*	-.215	-.169	1.000				
5. Caloric intake	-.414*	.800**	.016	-.343	1.000			
6. CH	.048	.493**	.237	-.112	.539**	1.000		
7. Protein	-.358	.542**	-.144	-.420*	.783**	.328	1.000	
8. Lipids	-.305	.760**	-.215	-.060	.735**	.284	.565**	1.000
9. PA	.068	-.036	.094	.528**	.066	-.044	-.117	.054

Source: Own development

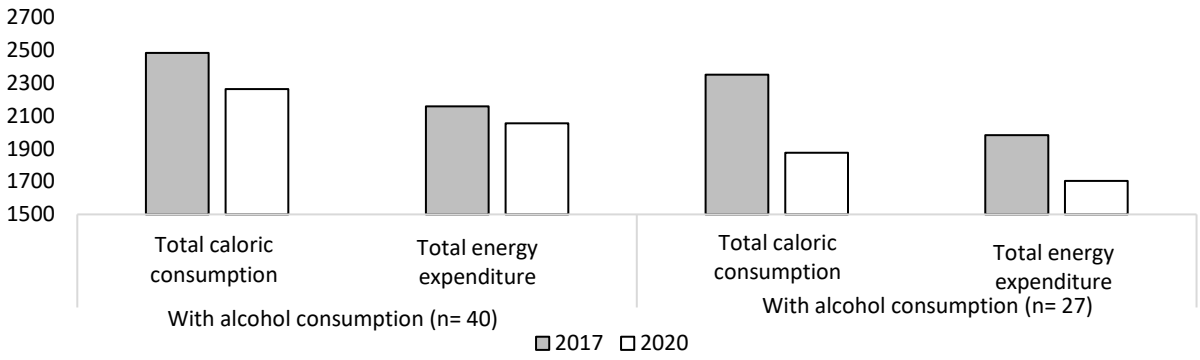
BMI=Body Mass Index, WC=Waist circumference; BF=Body fat; TEC=Total energy consumption; CH=Carbohydrates; PA=Physical activity.

*p<.05, **p<.01.

The retrospective analysis was used to determine changes between consumption patterns, body composition, and PA among sample participants. With the Wilcoxon test, only the percentage of BF showed differences between measurements. Between 2017 and 2020 measurements, both groups showed an increase in BMI ($p<.02$). Lower values were observed in the second measurement with respect to the first, with higher response averages for those who did consume alcohol in relation to those who did not do it.

Moreover, participants who did not consume alcohol showed differences regarding WC (p=.03), caloric intake, and TEC (p< .01 in both cases), (Figure 1).

Figure 1. Changes in caloric consumption and energy consumption of the participants with respect to the assessment of the year 2017 vs 2020. 2020 (n= 67).



Source: Own development

Discussion

In a sample of university students in the health area who were classified regarding alcohol consumption, the differences between body composition, regular nutrient intake, energy consumption and PA have been exposed. Four out of ten participants were overweight, with a higher incidence among those who consume alcohol. Statistical significant differences were observed regarding TEC, carbohydrate intake, WC and BF between those who consume and do not consume alcohol. The influence of alcohol consumption on the development of excess weight can arise through several mechanisms: a). Caloric intake of alcohol, b). Stimulation of the simultaneous intake of other foods such as sugary drinks and high-calorie foods such as red meat and fried foods, and c). Inhibition of satiety hormones (leptin) and stimuli at the central brain level, increasing appetite and stimulating energy intake [(7)].

Consumption of alcoholic drinks favors the development of excess weight since it is associated to energy intake (7 kcal/g), inhibition of fat oxidation and plasma leptin levels [(17)], allowing the accumulation of both, subcutaneous and visceral fats, in inadequate amounts with physiological consequences that can generate or aggravate non-communicable chronic diseases such as obesity [(18)], where a sedentary lifestyle has been

recognized as a risk factor [19]. Therefore, the adequate regulation of weight and body composition also implies maintaining an energy balance, controlling the intake of macronutrients through the diet (carbohydrates, proteins, lipids) [20] and stopping habits that are harmful to health such as alcohol consumption. It should be noted that higher prevalence of alcohol and tobacco consumption is more common in men than in women, which matches with the findings of other studies on the university population in Spain [21-22].

It has been pointed out that gender and country of origin influence the choice of healthy and unhealthy foods [23-24]; just to mention an example, in some contexts for women sensory attractiveness and body weight are very important while for men this is not significant [24]. However, women have shown a tendency to consume more sweet foods than men [23]. And it certainly has been reported that reducing alcohol consumption in middle-aged women is favorable for glucose regulation [25].

Significant statistical differences were found regarding TEC and carbohydrate consumption between those who consume and do not consume alcohol, with higher values for those who are consumers. When comparing between physically active and inactive people, it is identified that inactive people are more likely to be obese [17], without forgetting that, in addition, lower alcohol consumption has been reported as more PA is practiced. Other authors have reported that excessive alcohol consumption has been associated with lower levels of physical competence, additionally this could be a consequence of inducing a shift away from healthy lifestyles [26].

PA presented a direct significant statistical association with TEC. In general, moderate intensity physical exercise, equivalent to approximately 1,200 to 2,000 kcal per week, may be sufficient to prevent weight gain greater than 3% of total body weight [27], coupled with lower energy consumption ranging from 743.3 METs/wk for women and 1263.0 METs/wk for men [28]. Finally, a statistically significant direct association was seen between the consumption of proteins and lipids. Regarding the ingestion of macronutrients, there are authors who state that proteins are specially modified from the diet in order to modulate body weight [18];

however, it can be possible to show an excessive calorie consumption and, specifically, the consumption of carbohydrates, which is associated with an increase in body mass, BF and WC [29], thus, giving a positive energy balance with consequences already widely mentioned.

Social influence and the tendency to experiment during university education can lead to the regular development of sedentary lifestyles and with little time to eat, in which unhealthy eating styles are eaten between meals, eating foods of little nutritional value, and with increased consumption of alcohol and tobacco [17,28]. Some environmental factors favor malnutrition due to excess: the ease and preference for sweet or salty foods with high caloric value, a high intake of fats and rapidly absorbed carbohydrates [17].

Eating habits, the consumption of harmful substances or the regular performance of PA are conditioning factors of a healthy lifestyle [26]. The physical, social, and psychological consequences of alcohol consumption can negatively influence the individual who is the consumer, the family and the society, making educational and preventive interventions necessary [30]. Activities such as maintaining regular eating times and schedules, controlling the quality and quantity of nutrients and food consumed in a temporal framework could help stabilize body composition indicators [17]. It could be that alcohol consumption relaxes the measures and intention to maintain a healthy lifestyle in the university population.

The value of the findings of this study lies in the detail of the caloric and macronutrient consumption report that is presented in addition to the measurement by bioimpedance analysis; additionally, the longitudinal analysis of the changes in relation to time offered added value for the observation of trends and patterns of comparative behavior according to alcohol consumption. In this sample, evidence of the protective value of PA was obtained to increase TEC, reduce caloric intake, and BF. Limitations are related to sample representativeness, in addition to lack of use of objective methods such as accelerometry to measure PA. Given the findings regarding alcohol consumption and tobacco consumption, the evaluation of these aspects with valid and reliable questionnaires represents another area of opportunity to consider in future

work. Besides, upcoming investigations should consider the approach of longitudinal approaches and with objective measurements that give greater support to results obtained by questionnaires.

Conclusions

In this study, anthropometric differences and eating styles and PA between participants who consume and do not consume alcohol have been identified. Alcohol consumption leads to greater body composition, caloric consumption, and carbohydrate intake; in contrast, those who reported not consuming alcohol had lower energy expenditure compared to those who did consume alcohol. Between 2017 and 2020, an increase in the BMI of the participants was observed, at the same time, caloric consumption and energy consumption decreased. This may lead to a greater possibility of being overweight due to the association of these consumption and spending patterns. PA was associated to a higher TEC, so it could be considered a protective factor to face the risks related to consumption. Awareness of the influence of harmful habits on changes in body composition offers a scientific basis to guide the additional implications of these behaviors. Highlighting the importance of ensuring appropriate eating and PA patterns and preventing unhealthy habits among university students is useful to reduce health risks in this population group. Nurses can apply this information to promote health through educational strategies aimed at young people.

Conflicts of interest

The authors stated there was no conflict of interest.

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