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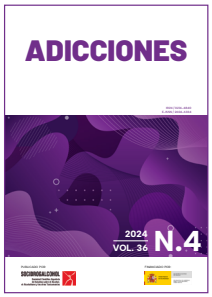

ORIGINAL

Impact of alcohol consumption and diet on quality of life in higher education. A structural equation model

Impacto del alcohol y la dieta en la calidad de vida en la educación superior. Un modelo de ecuaciones estructurales

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Abstract

Alcohol consumption among Spanish undergraduates during their university time has increased exponentially in recent years. In addition, this lifestyle change is associated with abandoning the Mediterranean diet, increasing the risk of suffering some kind of injury and affecting their quality of life. The study was carried out with a sample of 1,057 Spanish university students, 12.1% (n = 127) of them women and 87.9% (n= 930) men. The SF-36 questionnaire was used to measure health-related quality of life, the MEDAS test to check adherence to the Mediterranean diet, and the AUDIT test to measure alcohol consumption. The results show an inverse relationship between injury and quality of life (β= -0.020) and adherence to the Mediterranean diet (β= -0.042) among students who have suffered some kind of injury. On the other hand, there was a positive relationship with alcohol consumption (β= -0.046). The main conclusion is that lower alcohol consumption and higher adherence to the Mediterranean diet was associated with a better quality of life and a reduced risk of injury in undergraduates in southern Spain.

Keywords: quality of life, university students, alcohol, Mediterranean diet, injuries

Resumen

El consumo de alcohol de la juventud durante el periodo universitario ha aumentado exponencialmente en los últimos años. Además, el cambio de estilo de vida se asocia al abandono de la dieta mediterránea, aumentando el riesgo de sufrir algún tipo de lesión y afectando a su calidad de vida. El estudio se realizó con una muestra de 1057 estudiantes universitarios españoles, el 12,1% (n = 127) de mujeres y el 87,9% (n = 930) de hombres. Se utilizó el cuestionario SF-36 para medir la calidad de vida relacionada con la salud; el test MEDAS para comprobar la adherencia a la dieta mediterránea; y el test AUDIT para medir el consumo de alcohol. Los resultados muestran una relación inversa entre la lesión y la calidad de vida (β= -0,020) y la adherencia a la dieta mediterránea (β= -0,042) entre los estudiantes que han sufrido algún tipo de lesión. Por otro lado, se observa una relación positiva con el consumo de alcohol (β= -0,046). La principal conclusión es que un menor consumo de alcohol y una mayor adherencia a la dieta mediterránea se asociaron con una mejor calidad de vida y un menor riesgo de lesiones en los estudiantes universitarios del sur de España.

Palabras clave: calidad de vida, estudiantes universitarios, alcohol, dieta mediterránea, lesiones

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Late adolescence and youth are stages of life characterized by a series of physical, psychological and social changes (Brooks et al., 2021; Dewi et al., 2021). This process is decisively shaped by many external agents affecting personal habits and customs.

More specifically, starting university can involve a drastic transformation in terms of the excessive use of harmful substances such as alcohol and tobacco (Maric et al., 2021). Authors such as Noh-Moo et al. (2021) and Rial et al. (2020) have highlighted how alcohol use is greater during adolescence (Chen et al., 2018). Drinking increases during weekends, when most students build their social lives around the consumption of strong alcoholic beverages (Buvik et al., 2021). Furthermore, this premature and excessive drinking is linked to problems such as depression (Paulus et al., 2021) or stress (Greenwood et al., 2021), both pathologies closely related to quality of life (QoL).

However, diet is another aspect influenced by starting university, since young people leave the family home, become autonomous and prepare their own meals (Hudak et al., 2021; Winpenny et al., 2018). The eating patterns of Spanish families are based on adherence to the Mediterranean diet (MDA) (Aguilar-Martínez et al., 2021; Jiménez-Boraita et al., 2020), a diet typical of countries around the Mediterranean basin. It is characterized by the consumption of fresh products, vegetables, fruit and pulses and, at the same time, by the low consumption of processed products (Real et al., 2020). However, on leaving home, young people drastically modify their diet, consuming mainly pre-cooked products (Rodrigues et al., 2017). Increasingly, the combination of sedentary habits and easy access to fast foods lead young people to adopt an unbalanced diet and abandon familiar eating habits (Atencio-Osorio et al., 2020; Serra-Majem et al., 2020).

According to Blanco et al. (2020), sedentary habits have increased considerably in adolescents, and more significantly during weekends (Mielgo-Ayuso et al., 2017). Lack of physical activity leads to a worsening of the individual's physical condition (Diehl et al., 2021), potentially leading to injury when performing any movement requiring greater intensity (Fort-Vanmeerhaeghe et al., 2017). Injuries represent a reduction in the person's QoL as they can limit the degree to which an activity is practised or a daily task is performed (Chmelik et al., 2021).

QoL is understood as the absence of disease or the absence of limitations in daily task performance (Villafaina et al., 2021). Furthermore, according to recent studies (Kuczynski et al., 2020), QoL is associated with feelings of loneliness or social disengagement among university students. Other research, such as that of Aymerich et al. (2021), show how QoL is closely linked to life satisfaction or subjective well-being. Likewise, Losada-Puente et al. (2020) highlight the importance of physical, psychological and emotional elements in the development of the perception of QoL.

This research therefore aims to: a) analyze the relationships between QoL and associated variables such as alcohol use, MDA and injury risk; b) test a structural model that provides explanations for the risk of injury based on QoL in university students; c) analyze the differences between the variables studied with respect to having or not having suffered an injury through a multigroup analysis in a trajectory model.

Material and method

Design and sample

The study used a descriptive, cross-sectional and non-experimental design. The sample comprised 1,057 university students of Physical Activity and Sports Sciences in Almeria, Cadiz, Granada, Huelva and Seville (Spain), selected through convenience sampling. The sample was made up of 12.1% (n = 127) women and 87.9% (n = 930) of men, aged between 18 and 23 years (M = 20.78, SD = 2 .85).

Instruments

In this study, a total of four instruments were used to collect data. The first is an ad-hoc questionnaire for collecting sociodemographic data such as sex, age and injuries.

To measure alcohol use, the Spanish version (Rubio, 1998) of the Alcohol Use Disorders Identification Test (AUDIT; Saunders et al., 1993) was used. The scale comprises ten items, with the first eight answered on a Likert-type scale from 0 (*never*) to 5 (*daily*). The other two items are answered on a Likert-type scale with values of 0, 2 and 4 points. Reliability for the scale in this study was a Cronbach's alpha of $\alpha = 0.856$.

For MDA, the MEDAS test was used (Schröder et al., 2011). This has 14 items answered with *yes* or *no*. Three categories are established: around 14 points shows "high level adherence"; 8 to 11 points indicate "medium level adherence"; from 5 to 7 points "low level adherence"; and less than 5 reflect "very low adherence." Cronbach's alpha in the present study was 0.882.

Health-related QoL (Ware & Sherbourne, 1992) was measured using the Spanish version of the SF-36 questionnaire (Alonso et al., 1995). It comprises 36 items divided into eight dimensions. Twenty-six items are answered on a Likert-type scale from 1 (*always*) to 5 (*never*), and the other ten are answered on a Likert-type scale with three options from 1 (*yes, it limits me a lot*) to 3 (*no, it does not limit me at all*). These dimensions are: Physical Functioning (PF), Physical Role (PR), Bodily Pain (BP), General Health (GH), Vitality (VT), Social Functioning (SF), Emotional Role (ER) and Mental Health (MH). In the present research, Cronbach's *a* was 0.794.

Procedure

The research process covered different phases. In the first, authorization was requested from the Department of Body Expression and the Ethics Committee of the Faculty of Educational Sciences at Granada University (Spain), code number 1478/CEIH/2020. In the following phase, a document was prepared explaining the aims of the research and the study, and requesting informed consent from the participants. After 1,234 undergraduate students agreed to participate, a questionnaire was sent to the students by email using Google Forms. During the final phase, the responses of the 1,234 undergraduates were checked, and 177 questionnaires had to be discarded for not being properly completed, that is, having one or more items unanswered. Data analysis was carried out between July and September 2022, with participant confidentiality guaranteed at all times. The processing and analysis of the data was carried out following the human research guidelines of Granada University Ethics Committee, and the ethical principles established by the Declaration of Helsinki in 1975 and its update in Brazil in 2013.

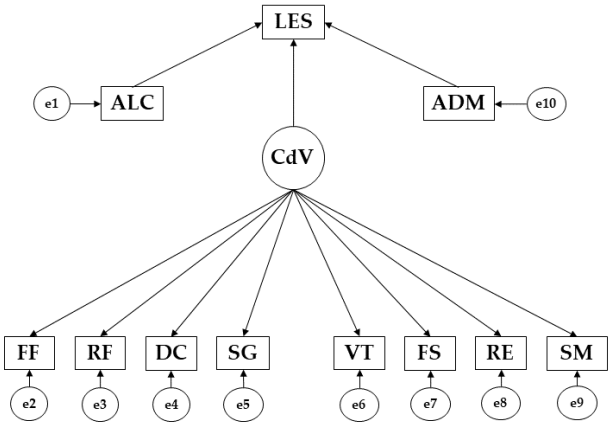
Statistical analysis

The statistical program IBM SPSS Statistics 25.0 (IBM Corp, Armonk, NY, USA) was used for the descriptive analysis of the results. An analysis of frequencies and means was performed. Additionally, Cronbach's alpha was used to determine the internal consistency of the instruments, with a 95% confidence interval.

For the structural equation model, we used the IBM SPSS Amos 26.0 program (IBM Corp., Armonk, NY, USA) to establish the relationships between the variables included in the theoretical model (Figure 1). A general model was developed for the study sample and two models to study the relationships between the variables according to injuries and non-injuries. In this case, the proposed model was made up of a total of eleven endogenous variables (INJ, ALC, MDA, PF, PR, BP, GH, VT, SF, ER and MH) and one exogenous variable (QoL). For endogenous variables, causal explanations were analyzed in view of the associations obtained between the measurement reliability indicators. Therefore, endogenous variable errors of measurement were included in this model and could be controlled and interpreted as multivariate regression coefficients. One-way arrows represent lines of influence between the latent variables and are interpreted from the regression weights. To determine the statistically significant differences in the models, Pearson's chi-square test was used, and the level of significance established at $p < 0.05$ and $p < 0.001$.

After estimating the parameters, model fit was assessed. In accordance with the recommendations of McDonald and Marsh (1990) and Bentler (1990), goodness of fit should be assessed on the chi-square, whose non-significant p values indicated good model fit. Nevertheless, these data cannot be interpreted in isolation due to the influence of sample susceptibility and size (Tenenbaum & Eklund, 2007), so other standardized fit indices were used. Thus, the comparative fit index (CFI) must obtain values above 0.95 for good model fit, the goodness-of-fit index (GFI) needs values above 0.90 for acceptable fit, values greater than 0.90 in the incremental reliability index (IFI) reflect acceptable fit, and, finally, values below 1 in the root mean square approximation (RMSEA) also indicate acceptable model fit.

Figure 1
Theoretical model



Note. Alcohol (ALC); Adherence to the Mediterranean diet (MDA); Injury (INJ); Quality of life (QoL); Physical functioning (PF); Physical role (PR); Bodily pain (BP); General Health (GH); Vitality (VT); Social functioning (SF); Emotional role (ER); Mental health (MH).

Results

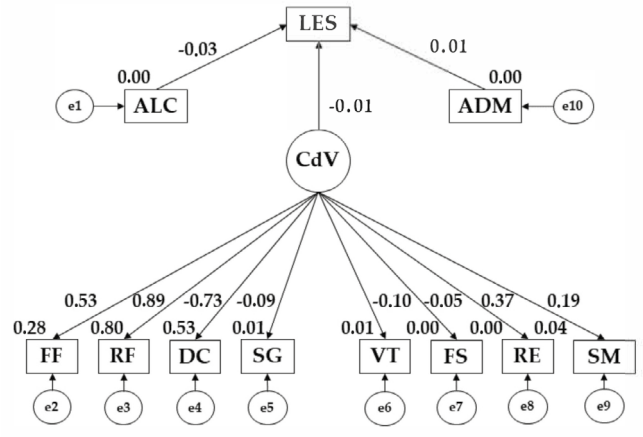
Table 1 shows the basic descriptives for QoL, alcohol use and MDA depending on having suffered an injury or not. In relation to the variables assessed for the general sample, a good fit was found for all the indices in the model developed. The CFI analysis yielded a value of 0.978, representing an excellent fit. A value of 0.965 was obtained in the NFI analysis; the IFI was 0.945 and the Tucker-Lewis Index (TLI) yielded a value of 0.934, which was excellent. Furthermore, the RMSEA was 0.054.

The regression weights of the general model can be seen in Figure 2 and Table 2. Note the negative relationship between the INJ variable and QoL (β = -0.013), as well as with ALC (β = -0,03). However, for the link between MDA and INJ, positive relationships were found (β = 0.01). Positive relationships were likewise observed for the QoL variable with MH (β = 0.193; $p < 0.001$), ER (β = 0.366; $p < 0.001$;), PR (β = 0.894; $p < 0.001$) and PF (β = 0.527; $p < 0.001$). Negative relationships were found with respect to SF (β = -0.054; $p < 0.001$), VT (β = -0.96; $p < 0.001$), GH (β = -0.89; $p < 0.001$) and BP (β = -0.730; $p < 0.001$).

The model developed for participants with injuries also showed good fit values. The CFI yielded a value of 0.965, the NFI a value of 0.954 and the IFI was 0.962. Additionally, the TLI was 0.953, and the RMSEA 0.055.

The regression weights are shown in Figure 3 and Table 2, with statistically significant values ($p < 0.001$). A negative relationship was found between INJ and QoL (β= -0.020), as well as with MDA (β = -0.042). Positive relationships were observed with ALC (β = .046). In terms of QoL, positive relationships were found with PF (β = -0.612; $p < 0.001$), SF (β = 0.097; $p < 0.001$), PR (β = 0.889; $p < 0.001$), ER (β = 0.407; $p < 0.001$) and MH (β = 0.208; $p < 0.001$). However, the relationships with BP (β = -0.695; $p < 0.001$), GH (β = -0.083; $p < 0.001$) and VT (β = -0.061; $p < 0.001$) were negative.

Figure 2
Structural equation model for the sample



Note. Alcohol (ALC); Adherence to the Mediterranean diet (MDA); Injury (INJ); Quality of life (QoL); Physical functioning (PF); Physical role (PR); Bodily pain (BP); General Health (GH); Vitality (VT); Social functioning (SF); Emotional role (ER); Mental health (MH).

Table 1
Descriptive data based on injury

	Injury	N	M	SD
GH	NO	485	14.88	1.702
	YES	572	13.87	1.863
SF	NO	485	6.95	0.922
	YES	572	6.90	0.889
VT	NO	485	13.81	2.054
	YES	572	13.02	2.018
MH	NO	485	19.94	1.830
	YES	572	19.15	1.948
BP	NO	485	3.61	2.013
	YES	572	3.84	1.948
ER	NO	485	5.66	0.830
	YES	572	5.15	0.950
PR	NO	485	7.63	1.035
	YES	572	6.98	1.036
PF	NO	485	29.67	0.835
	YES	572	29.38	1.161
ALC	NO	485	27.48	4.167
	YES	572	27.98	4.347
MDA	NO	485	1.13	0.312
	YES	572	1.09	0.334

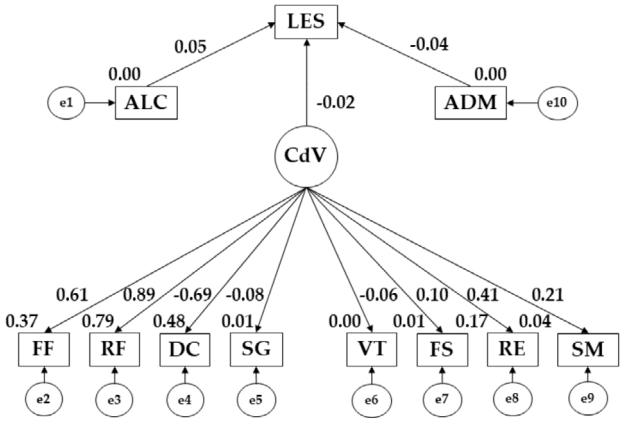
Note. Mean (M); Standard deviation (SD); General Health (GH); Social functioning (SF); Vitality (VT); Mental health (MH); Bodily pain (BP); Emotional role (ER); Physical role (PR); Physical functioning (PF); Alcohol (ALC); Adherence to the Mediterranean Diet (MDA).

Table 2
Structural equation model for the sample

Association of variables	R.W.				S.R.W.
	Estimation	S.E.	C.R.	*p*	Estimation
MH ←QoL	1.000				.193
ER ←QoL	1.495	.283	5.278	***	.366
SF ←QoL	-.333	.213	-1.561	.118	-.054
VT ←QoL	-.664	.257	-2.590	*	-.096
GH ←QoL	-.432	.178	-2.429	*	-.089
BP ←QoL	-9.848	1.699	-5.797	***	-.730
PR ←QoL	3.157	.546	5.783	***	.894
PF ←QoL	.737	.131	5.625	***	.527
INJ ←ALC	-.028	.026	-1.094	.274	-.034
INJ ←MDA	.068	.187	.362	.717	.011
INJ ←QoL	-.085	.227	-.375	.708	-.013

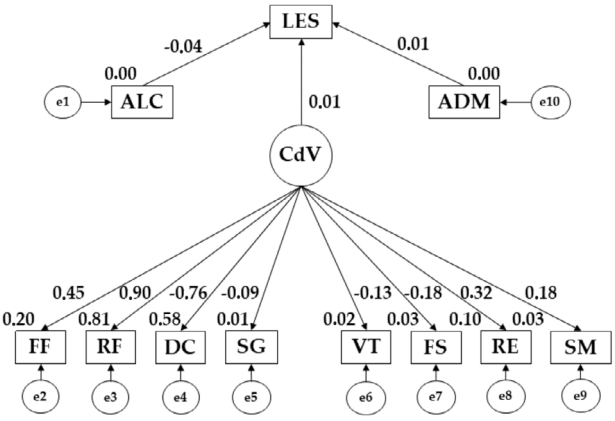
Note. Regression weight (R.W.); standardized regression weight (S.R.W.); Standard error (S.E.); Critical relationship (C.R.); Alcohol (ALC); Adherence to the Mediterranean diet (MDA); Injury (INJ); Quality of life (QoL); Physical functioning (PF); Physical Role (PR); Bodily pain (BP); General Health (GH); Vitality (VT); Social functioning (SF); Emotional role (ER); Mental health (MH); * Statistically significant relationship at p < .05 level; *** Statistically significant relationship at p < .001 level.

Figure 3
Structural equation modeling for injured individuals



Note. Alcohol (ALC); Adherence to the Mediterranean diet (MDA); Injury (INJ); Quality of life (QoL); Physical functioning (PF); Physical role (PR); Bodily pain (BP); General Health (GH); Vitality (VT); Social functioning (SF); Emotional role (ER); Mental health (MH).

Figure 4
Structural equation modeling for uninjured individuals



Note. Alcohol (ALC); Adherence to the Mediterranean diet (MDA); Injury (INJ); Quality of life (QoL); Physical functioning (PF); Physical role (PR); Bodily pain (BP); General Health (GH); Vitality (VT); Social functioning (SF); Emotional role (ER); Mental health (MH).

Table 3
Structural equation model for injured individuals

Association of variables	R.W.				S.R.W.
	Estimation	S.E.	C.R.	*p*	Estimation
MH ←QoL	1.000				.208
ER ←QoL	1.600	.416	3.849	***	.407
SF ←QoL	.525	.294	1.784	.074	.097
VT ←QoL	-.369	.314	-1.174	.240	-.061
GH ←QoL	-.377	.242	-1.556	.120	-.083
BP ←QoL	-8.269	1.988	-4.159	***	-.695
PR ←QoL	2.849	.681	4.177	***	.889
PF ←QoL	.852	.207	4.109	***	.612
INJ ←ALC	.005	.005	.998	.318	.046
INJ ←MDA	-.034	.036	-.927	.354	-.042
INJ ←QoL	-.016	.040	-.405	.686	-.020

Note. Regression weight (R.W.); standardized regression weight (S.R.W.); Standard error (S.E.); Critical relationship (C.R.); Alcohol (ALC); Adherence to the Mediterranean diet (MDA); Injury (INJ); Quality of life (QoL); Physical functioning (PF); Physical Role (PR); Bodily pain (BP); General Health (GH); Vitality (VT); Social functioning (SF); Emotional role (ER); Mental health (MH); * Statistically significant relationship at p < .05 level; *** Statistically significant relationship at p < .001 level.

Table 4
Structural equation model for uninjured individuals

Association of variables	R.W.				S.R.W.
	Estimation	S.E.	C.R.	*p*	Estimation
MH ←QoL	1.000				0.179
ER ←QoL	1.371	0.384	3.574	***	0.321
SF ←QoL	-1.241	0.435	-2.854	*	-0.177
VT ←QoL	-0.998	0.428	-2.332	*	-0.127
GH ←QoL	-0.500	0.266	-1.881	0.060	-0.095
BP ←QoL	-11.558	2.889	-4.001	***	-0.758
PR ←QoL	3.519	0.884	3.979	***	0.902
PF ←QoL	0.629	0.165	3.811	***	0.447
INJ ←ALC	0.044	0.252	0.174	0.862	0.008
INJ ←MDA	0.028	0.027	-1.042	0.297	-0.043
INJ ← QoL	-0.015	0.186	-0.082	0.935	-0.003

Note. Regression weight (R.W.); standardized regression weight (S.R.W.); Standard error (S.E.); Critical relationship (C.R.); Alcohol (ALC); Adherence to the Mediterranean diet (MDA); Injury (INJ); Quality of life (QoL); Physical functioning (PF); Physical Role (PR); Bodily pain (BP); General Health (GH); Vitality (VT); Social functioning (SF); Emotional role (ER); Mental health (MH); * Statistically significant relationship at p < .05 level; *** Statistically significant relationship at p < .001 level.

Furthermore, the values found for each index in the model with non-injured participants were acceptable. The CFI analysis had a value of 0.958, the NFI a value of 0.953 and the IFI was 0.958. The TLI obtained a score of 0.947, while the RMSEA yielded a result of 0.058.

Figure 4 and Table 3 show the model's regression weights, with statistically significant differences at the levels $p < 0.05$ and $p < 0.001$. The relationship between LES and QoL (β = -0.003) and MDA (β = -0.043) was negative, although there was a positive relationship with ALC (β = 0.008). For QoL, positive relationships were found with PF (β = 0.447; $p < 0.001$), PR (β = 0.902; $p < 0.001$), ER (β = 0.321; $p < 0.001$) and MH (β = 0.179; $p < 0.001$). Conversely, negative relationships were observed with BP (β = -0.758; $p < 0.001$), GH (β = -0.095; $p < 0.001$), VT (β = -0.127; $p < 0.001$) and SF (β = -0.177; $p < 0.001$).

Discussion

In the present study, a multigroup analysis was carried out with the aim of identifying the relationships between QoL, alcohol use and the Mediterranean diet in university students, depending on whether or not they had suffered an injury. The model yielded a good fit, offering a good explanation of the associations between QoL and the aspects influencing injuries among university students, in line with several other national and international studies (Baden et al., 2020; Dalwood et al., 2020; Knox & Muros, 2017; Moral-García et al., 2020).

When analyzing alcohol use, this is shown in the proposed structural model to be positively associated with having suffered some type of injury, while in those university students reporting no injury, this association is of lower strength. Many studies show how alcohol intake and injuries are related, since it has been widely demonstrated that alcohol acts as a determining factor in increasing the likelihood of suffering injuries (Htet et al., 2020; Lechner et al., 2020; Schnettler et al., 2015).

Likewise, there was a negative association in college students between MDA and having suffered some type of injury. Based on these results, it can be seen how having high MDA adherence is associated with a lower risk of suffering any type of injury (Buckland & González, 2015; Lemma et al., 2021; Martini, 2019). This is a reflection of university students renouncing traditional diets in favour of Western diets (Andrade et al., 2020). The intake of processed foods is linked to a higher incidence of injury risk and a greater likelihood of suffering from cardiovascular diseases, cancer, diabetes and obesity (Romagnolo & Selmin, 2017).

Regarding the influence of QoL on the risk of suffering some type of injury, a negative relationship is observed. Results show how those with some type of injury have seen their QoL reduced, whether for a short or a prolonged period of time. These results are also similar to those obtained by Tonapa et al. (2021), who revealed that individuals who had suffered an extreme injury had experienced a reduction in their QoL. On the other hand, Busse et al. (2019) pointed out how people with well-developed coping strategies improved their QoL.

Some of the main limitations of this study should be noted. Firstly, its methodological design is descriptive, transversal and assessed on a single group of individuals. Such a methodology does not allow causal relationships to be established between the ideas investigated. It does, however, allow the status of an issue in a given population to be easily diagnosed. Similarly, the data do not allow extrapolation beyond the students of the Physical Activity and Sports Sciences degree. Some extraneous variables, such as the sex of the participants or their place of residence, had a moderating effect and were not taken into account in the study. It would therefore be important to design and carry out a longitudinal study to be able to follow how the relationships between the variables develop over time.

Conclusions

In conclusion, lower alcohol use and higher MDA adherence were associated with better QoL and lower risk of injury in university students in southern Spain. The results of this study support further research examining the relationship between dietary factors and QoL with better methodological design (i.e., prospective studies). More evidence is needed to better understand the relationship between QoL factors, MDA adherence, alcohol use, and injury risk.

Conflicts of interest

The authors declare no conflict of interest.

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