Use of Energy Drinks and Insomnia Symptoms in Medical Students from a Peruvian University

Mendoza-Lugo, Marco Gonzalo[1a], Cornejo-Venegas, Gonzalo[1,2a], Al-kassab-Córdova, Ali[1,2a], Rosales-Krumdieck, Álvaro Andrés[1a], Chávez-Ramos, Bruno Samir[1,2a], Alvarado, Germán F.[1,b]

The objective of this study is to find the correlation between energy drinks consumption and insomnia symptoms in medicine students from one university in Lima, Peru. **Materials and Methods:** *This is a cross-sectional analytic study. The target population was second and fifth year medicine students, from one Peruvian university, located in the Lima sur District. 289 students participated in the study. A survey with one questionnaire on energy drinks consumption and the Insomnia Severity Index was used. The cutting edge was set at 15, in order to consider relevant insomnia symptoms. The multivariate/crude/adjusted analysis was made by using the Poisson Regression Model with adjusted/robust variance, according to sex, age, coffee consumption, plus anxiety and depression backgrounds, in order to obtain the PR (prevalence Ratios) with a confidence interval of 95%.* **Results and Discussion:** *prevalence of insomnia symptoms in the sample studied was 21.80%, while energy drinks consumption was 39.45%. A significant correlation (p=.008) was found between consumption of this type of drinks and presence of insomnia symptoms. Additionally, students who use this energy drinks were found to have 1.78 times more chances to have insomnia symptoms (IC95%: 1,13-2,82), compared with those who did not use energy drinks (p=.013).* **Conclusions:** *There is a correlation between energy drinks consumption and insomnia symptoms.*

Key Words: *Energy drinks, insomnia*

INTRODUCTION

According to the International Classification of Sleep Disorders (ICSD) insomnia is defined as a "difficulty for the onset, duration, and consolidation or quality sleep, despite the person remains in a comfortable environment for sleeping". It may happen before falling sleep, during sleep or at the time to wake up. Additionally, subjective dissatisfaction per quantity or quality of sleep plus the discomfort and clinically significant impairment in important functional areas (social, labor, academic areas) during --at least-- 3 months are the criteria stated by the Diagnostic and Statistical Manual of Mental Disorders 5 (DSM-5) to perform insomnia diagnosis[1,2].

A significant amount of college students has insomnia symptoms. A meta-Analysis made in China reported that 23.6% of students had in-

[1]   School of Medicine, Universidad Peruana de Ciencias Aplicadas. Lima, Perú
[2]   Sociedad Científica de estudiantes de Medicina, de la Universidad Peruana de Ciencias Aplicadas
[a]   Medicine Student of the Universidad Peruana de Ciencias Aplicadas
[b]   Phd in Epidemiology

1

somnia symptoms[3]. In Saudi Arabia, 67% of students were reported to suffer some sort of sleep disorder[4]. In Cuba, the figure was 71% among first-year college students[5].

Insomnia has been associated to multiple factors. However, a higher risk to suffer insomnia symptoms in women and elderly people older than 65 years old has been reported. Additionally, people who have comorbidities (specially lung diseases, heart failure, and conditions associated to pain, such as cancer) are under an increasing risk to suffer insomnia, as well as patients with neurodegenerative disorders. Likewise, the use of certain drugs, such as stimulants (caffeine, nicotine), antidepressants, beta-antagonists, inhibitors of calcium channels and glucocorticoids are correlated to the presence of insomnia symptoms[6], which is translated into fatigue, memory problems, drowsiness, difficulty to keep concentrated and mood changes[7].

Energy drinks (EDs) are displayed in a series of products made with high concentration of some dietary supplements, such as caffeine, taurine and sugars. These favor energy increase, attention, sports performance and time of concentration. However, these cause various adverse effects: sleep disturbances, cephalea, nauseas, chest pain, vomiting, tachycardia and convulsions. These are more frequent among young people[8,9].

Caffeine and the taurine contained in EDs stimulate brain activity, memory and attention. Caffeine is a purine alkaloid, acting as an non selective antagonist of the A1/A2 adenosine receptor, which stimulates the central nervous system; it improves physical performance and mental activity; it favors cholinergic/dopaminergic neurotransmission. On the other hand, taurine is an amino acid synthetized in our body, and is based on cysteine metabolism, to be spread around in various organs. In the nervous system, it reduces dopamine release, as it acts as an antagonist of NMDA receptor, which regulate the function of the dopaminergic neurons. Additionally, it stimulates development of nervous tissue, it improves synaptic transmission and produces a neuroprotecting effect[10].

A study made in Chile, correlated EDs consumption and poor sleep quality. The results reported that those students who had poor sleep quality had a higher chance to have consumed EDs during the last week (59.9% versus 49.7%[11]. A study made in Peru, with 2,458 college students, reported that 1,509 consumed EDs; 411 did it --at least-- 3 times a week. Likewise, the study identified that 44% of all students had a poor sleep quality. Those students who consumed 3 or more EDs per week were reported to have 1.76 times higher chance to suffer poor sleep quality[12].

A study made in Saudi Arabia reported that 52.6% of medicine students once consumed EDs and 33.4% consumed EDs on a regular basis. From all regular consumers, 56.4% reported that the reason to consume them was to have more energy for studying[13]. In Latam a reduced number of studies have been performed aimed to correlate insomnia symptoms and EDs consumption. No other studies have been found aimed to find this correlation in medicine students. Likewise, the only big study measuring poor quality sleep made in our country, used an interview, but not a validated instrument[12].

For this reason, our study is aimed to find prevalence of EDs consumption in 2nd/5th year medicine students, and the correlation with insomnia symptoms, quantified with the Insomnia Severity Index.

MATERIALS AND METHODS

This is a cross sectional analytic. The population was made up of students -- at least 18 years old—from the School of Medicine of one private university, in Lima sur, who participated in the in the cycle of studies 2018-2, who were studying in the second and fifth year who were present during the interview. It is important to highlight that this university is focused on medium-high income economic status. Those students of the second year were those participating in the course of immunology; those students of fifth year were those participating in the course of surgery. Both courses are obligatory for those years. This population included 410 students: 331 of them studied their second year, 79 were studying their fifth year. The sample size was calculated, according to a hypothesis contrast scenario, with a confidence interval of 95% and a potency of 80%. As a base a previous study made in Chile was used[11] The pre-

valence reported in population 1 was 63%; prevalence for population 2 was 45%. EpiDat4.2 was used and the result obtained was 260. This population was adjusted for 5% of rejection and for 10% of improper filling out. The minimum sample size obtained was 306. All students were contacted, only reaching up to 303. This is explained by classes absenteeism or because some of them quit a subject. 14 surveys did not meet the outcome, as they were incomplete or the participant did not respond to the control variables; these were not counted for the study.

This retrieval instrument dealt with an anonymous self-managed questionnaire made up of 2 parts. The first part was made up of 11 questions about demographic characteristics (3 questions), EDs consumption and EDs consumption pattern (5 questions) and control for coffee consumption; anxiety and depression background (3 questions). EDs consumption during the cycle of studies 2018-2 (August-November) was taken into account. The questions were taken from a previous study[14] and were translated into Spanish. The second part included the ISI (Insomnia Severity Index). This part was validated in its English version, in 2001[15]; its Spanish version was validated, in 2012[16]. In a previous study, it reported a sensitivity of 86% and a specificity of 88%[17]. This instrument was preferred instead of other similar ones, because it is shorter, it has a good correlation index and make emphasis on the presence of insomnia symptoms; not on quality sleep. ISI use, in its Spanish version, for this study, was authorized by Fernandez-Mendoza J[16].

The response variable was the presence of insomnia symptoms, measured according to ISI score. ISI has 4 results, according to the score obtained: lack of symptoms (0-7), sub clinic insomnia (8-14), moderate clinic insomnia(15-21) and severe clinic insomnia (22-28). This result was dichotomized in lack of insomnia symptoms (0-14) and presence of insomnia symptoms (15-28). Exposure variables were EDs consumption during the cycle 2018-2 (Yes / No), the number of EDs consumed per month (1-5, 6-10, 11-20, 21-40) and the number of EDs (<1, 1, 2-3, >3)

Control variables were: age, numeric type; sex, masculine or feminine; coffee consumption and diagnosis record made by a health profes-

sional regarding anxiety and/or depression. In the last 3 cases, choices "Yes / No" were given.

The interviewers were 5 members of the research team. The interview was applied during the classes of Immunology and Surgery. Prior a this, information, an informed verbal consent was provided and the participants´ questions were answered. The information was used for building a data base in Microsoft Excel. For controlling data quality obtained the double digitization was used.

The data analysis was made in STATA15 for Windows. For the descriptive statistics, a table of absolute/relative frequencies was used. Measures of dispersion/central tendency measures were used for the numeric variable. For the bivariate analysis the chi square statistics test was used for comparing the independent variables related with "EDs consumption" against the dependent variable "presence of insomnia symptoms". In case of the quantitative variable "age", the Kruskall-Wallis Test was used. The normality of the variable was determined by means of the Shapiro-Wilk Test; homogeneity of variances was determined by means of the Levene Test. Finally, the multivariate/crude/adjusted analysis was made by means of the Poisson Regression Model with a robust variance aimed to obtain prevalence ratios with a confidence interval of 95% and a level of significance of 5%. It was adjusted by sex, age, coffee consumption, depression background and anxiety background.

The research protocol for this work was reviewed and approved by the Research Ethics Committee of the Universidad Peruana de Ciencias Aplicadas. In each questionnaire a flyer was attached with relevant information about insomnia. Confidentiality of the information provided was guaranteed by means of anonymity in the surveys. Only the members of the research team had access to the data base.

RESULTS

306 surveys were made. 289 were completed. Only completed surveys were included in the study. From all of them, 66.09% were female respondents. The median age was 20 years old (RIC: 19-22). 79.93% of the participants were second year students. prevalence of insomnia

symptoms was reported in 21.80%. On the other hand, 39.45% reported to have consumed EDs within the cycle. From all participants, 16.96% reported to consume 1 ED at a time; 11.76% reported to have consumed 2 or more EDs at a time. prevalence of coffee consumption was 81.31%. prevalence of depression/ anxiety background were 16.61% and 24.57%, respectively (See Table 1).

A correlation between EDs consumption and presence of insomnia symptoms was reported (p=0.008). Correlation among sex; years of study; age; coffee consumption; and anxiety background or depression, along with insomnia symptoms presence (p>.05) were not reported. The number of EDs consumed during the month (p=0.001), the number of days they consumed EDs (p<0.001), and the number of EDs consumed at a time (p=0.001) was directly correlated with presence of insomnia symptoms (See Table 2).

Taking into account the adjusted analysis

TABLE 1. Characteristics of the Students

Variables		Categories	N	%
Age (years)*		20 (19-22)		
Sex		Masculine	98	33,91
		Feminine	191	66.09
Year of studies		Second year	231	79.93
		Quinto year	58	2007
Insomnia**		No	226	78.20
		Yes	63	21.80
Coffee consumption		No	54	18.69
		Yes	235	81.31
Depression background		No	241	83.90
		Yes	48	16.61
Anxiety background		No	218	75.43
		Yes	71	24.57
Energy drinks consumption in the cycle 2018-2		No	175	60.55
		Yes	114	39.45
	Energy drinks consumption during the last month	None	175	60.55
		1--5	65	22.50
		6+	49	16.95
	Energy drinks consumption, at a time	None	175	60.55
		Less than 1, at a time	31	10.73
		1 at a time		
		2 or more, at a time	49	16.96
			34	11.76
	Days per month consuming energy drinks	None	175	60.55
		1--3	75	25.95
		4+	39	13,49

*Median (RIC)
**Cutoff point higher than 14 in the ISI Scale

TABLE 2: Factors Associated to Insomnia. A Bivariate Analysis

		Insomnia n (%)	No insomnia n (%)	p
Energy drinks				
	Consume	34 (29,82)	80 (70,18)	0,008
	No consume	29 (16,57)	146 (83,43)	
Sex				
	Masculine	19(19,39)	79 (80,61)	0,477
	Feminine	44 (23,04)	147 (76,96)	
Year of studies				
	Second year	55 (23,81)	176 (76,19)	0,099
	Quinto year	8 (13,79)	50 (86,21)	
Age (years)*		20 (19-21)	20 (19-22)	0,092
Coffee				
	Consume	53 (22,55)	182 (77,45)	0,517
	No consume	10 (18,52)	44 (81,48)	
Anxiety background				
	Yes	20 (28,17)	51 (78,20)	0,134
	No	43 (19,72)	175 (80,28)	
Depression background				
	Yes	12 (25)	36 (75)	0,556
	No	51 (21,16)	190 (78,84)	

*Median (RIC)
Chi Square Test was used

per variables, such as sex, age, coffee consumption and background of depression and anxiety, people who consumed EDs were reported to have 1.78 times more chances to have insomnia symptoms, compared with those who did not consume EDs (IC95%: 1.13-2.82; p=0.013) (See Table 3).

DISCUSSION

The main findings in this study report that interviewed students who consume EDs have a higher prevalence of insomnia symptoms, compared with those who do not consume them. From all the participants, 39.45% reported to have consumed EDs --at least-- once during this academic cycle. On the other hand, 21.80%

had clinical symptoms of insomnia. Additionally, 29.82% of the people who consume EDs reported to have insomnia symptoms. In contrast, prevalence of insomnia symptoms in students who do not consume EDs was 16.57%. In this way, insomnia symptoms were reported to be more prevalent among people who consume EDs.

In a previous study, Sanchez et al. reported that 55.9% of the students had poor sleep quality[12]. In contrast, prevalence of the problem in our study was 21.80%. This mismatch may be explained by the use of various study instruments, which highlights the importance of evaluating clinical symptoms of insomnia; and not only quality sleep. Likewise, our study reported a higher frequency of insomnia symptoms

TABLE 3: Factors Associated to Insomnia

		Insomnia n (%)	No insomnia n (%)	p
# EDs in the month				
	0	29 (16.57)	146 (83.43)	
	1-5	14 (21.54)	51 (78.46)	0.001
	6+	20 (40.82)	29 (59.18)	
# Days consuming EDs				
	0	29 (16.57)	146 (83.43)	
	1-3	16(21.33)	59 (78.67)	< 0.001
	4+	18 (46.15)	21 (53.85)	
# EDs consumed at a time				
	0	29 (16.57)	146 (83.43)	
	<1	8 (25.81)	23 (74.19)	
	1	10 (20.41)	39 (79.59)	0.001
	>=2	16 (47.06)	18 (52.94)	

EDs = Energy drinks
Chi Square Test was used

in women (23.04%) than in men (19.39%). The distribution of these results matches what has been previously described in Peru (12), but it does not match with the studies made in India and Iran, where a higher prevalence of insomnia symptoms was reported in men[18.19].

prevalence of EDs consumption in the participants of this study is 39.45%. From all of them, only 10.73% consume less than 1 ED at a time. In similar studies, a lower prevalence of consumption of these drinks was reported, as in the case of the research made by Bawazeer, et al, where the prevalence reported was 27.2%. The same study found that 71% of EDs consumers reported to have consumed less than one drink all the times when they consumed these drinks[20].

Our study found that 29.82% of the participants who consume EDs have insomnia symptoms. Similarly, Marmorstein et al., describe that EDs consumption is correlated with 23% chances to reduce sleep hours[21]. Likewise, the study made by Kim et al. found that participants who consumed 1 or 2 EDs per week had 1.59 times higher risk to have less than 6 hours of sleep per day, against those who do not consume EDs[22]. These results match this study, whe-

re EDS consumers have 1.78 more probabilities to have insomnia symptoms.

A prevalence of depression in 16.61% of the students was reported. A study made in health science students, in one university of Peru found a similar prevalence of moderate depression, by means of a self-report (18.9%)[23]. Likewise, our study reported 24.57% prevalence of anxiety. In both cases, the figure is widely higher than the prevalence identified in the general population, in Peru: 3.5% and 7.9% respectively[24]. However, further studies did not use self-report.

This study has some limitations, as the fact it was made in a private university; therefore, these results cannot be extrapolated to the general population of medicine students. The various socio-cultural environments found in other colleges could lead to a discrepancy. Additionally, as this is a cross sectional study, and it is only possible to determine correlations among the variables, but not a causal correlation. Likewise, no control for consumption of psychotropic substances was made, which may interfere with the regular sleep cycles. Another limitation is a possible bias in the prevalence of control variables as a background of "anxie-

6

Table 4: Factors Associated to Insomnia. Multivariate analysis

Variables		PRc	IC95%	P	PRa	IC95%	P
Consumption of EDs during the cycle		1.80	1.16-2.78	0.008	1.78	1.13-2.82	<0.013
# EDs in the month							
	0	Ref	Ref	Ref			
	1-May	1.29	0.73-2.30	0.370			
	>=6	2,46	1.53-3.95	<0.001			
# Days consuming EDs							
	0	Ref	Ref	Ref			
	1-Mar	1.28	0.74-2.22	0.366			
	>=4	2.78	1.73-4.48	<0.001			
# EDs consumed, at a time							
	0	Ref	Ref	Ref			
	<1	1.55	0.78-3.08	0.205			
	1	1.23	0.64-2.35	0.528			
	>=2	2.84	1.74-4.62	<0.001			
Sex							
Masculine		Ref	Ref	Ref	Ref	Ref	Ref
Feminine		1.18	0.73-1.92	.482	1.21	0.72-2.03	0.461
Year of studies							
Second year		Ref	Ref	Ref			
Fifth year		0.58	0.29-1.14	0.118			
Age (years)		-0.18	-0.04-0.006	0.146	0.91	0.80-1.04	0.198
Coffee		1.21	0.66-2.32	0.526	0.97	0.51-1.83	0.932
Background							
Anxiety		1.42	0.90-2.25	0.128	1.39	0.78-2.47	0.262
Depression		1.18	0.68-2.04	0.551	0.84	0.44-1.60	0.592

EDs = Energy drinks
Adjusting sex, age, coffee consumption and background of depression or anxiety

ty and depression", as these were measured by means of a self-report. On the other hand, one of the strengths of this research was to use the Insomnia Severity Index, as it has just a few questions, compared with the Pittsburgh Sleep Quality Index, with no significant sensitivity loss aimed to detect insomnia symptoms. Additionally, unlike others studies made in college students in Latam, the scope of this research study is focused on medicine students, which provides information about a group not much studied in the region and is quite relevant in our country. Finally, a huge strength of this study is that the data retrieval method was a census, which allows to retrieve representative results from the goal population.

This work determined that EDs consumption is correlated with the presence of insomnia symptoms in medicine students: Therefore, it is necessary to perform more studies and take measures, in order to avoid this harmful effect for the various functional areas. Additionally, it promotes execution of a new research, in order to determine the factors associated to con-

sumption of these drinks in medicine students. This will allow colleges to identify the factors influencing students to consume EDs and probably suffer insomnia symptoms, and use these data in order to prevent its onset or worsening. On the other hand, new research aimed to include participation of private and public colleges must be promoted, in order to obtain a representative sample of the medicine students population of the country.

Finally, taking into account the results obtained in this research, it is recommended that if future researchers want to inquire about the existing correlation between EDs consumption and insomnia symptoms they must use the Insomnia Severity Index; as, in this study we have reasserted it usefulness to measure insomnia symptoms. For future research, it is recommended to use a model of longitudinal research, in order to find a direct causality between both variables and higher reliability of the results. Additionally, it is recommended to perform studies --at the beginning of the academic term-- in order to avoid a potential reduction of the goal population. Likewise, it is recommended further research in this topic, in order to identify the factors causing EDs consumption and others factors which could be correlated to consumption of these drinks; specially, consumption of psychotropic drugs. Finally, colleges are recommended to perform activities limiting EDs consumption.

This research concluded that prevalence of EDs consumption was 39.45%; prevalence of insomnia symptoms was 21.80 %. Likewise, EDs consumption are correlated to the presence of insomnia symptoms in medicine students of second and fifth year; compared with those who do not consume EDs, among which a higher prevalence of insomnia symptoms was reported. For this reason, it is recommended that colleges must raise awareness in students about EDs consumption side effects and the importance of good sleep.

BIBLIOGRAPHY

1. Álamo González C, María Luz Alonso Álvarez D, Francesca Cañellas Dols D, Belén Martín Águeda D, Pérez Díaz H, Terán Santos J. Insomnia. Sociedad Española of the Sueño. 2016. 1–82 p.

2. American Psychiatric Association., Kupfer, D. J., Regier, D. A., Arango López, C., Ayuso-Mateos, J. L., Vieta Pascual, AND., & Bagney Lifante A. DSM-5: Manual diagnosis and estadístico of the mental disorders (5a ed.). 2014.

3. Li L, Wang AND-AND, Wang S-B, Zhang L, Li L, Xu D-D, et al. prevalence of sleep disturbances in Chinese university students: a comprehensive meta-analysis. J Sleep Res. 2018;27(3):e12648.

4. AlQahtani MS, Alkhaldi TM, Mutib To the-Sultan A, Bin Shihah AS, Saad Aleid A, Khater Alzahrani Z, et al. Sleeping Disorders among Medical Students in Saudi Arabia; in Relation to Anti-Insomnia Medications. Egypt J Hosp Med. 2017;69(7):2750

5. García Gascón Á, Querts Méndez OR, Hernández González RC, Agüero Martén R, Cascaret Soto X. Some variables biológicas related with disorders of the sueño en students of first year of medicine. MEDISAN. 2015;19(8):978–83.

6. Masters PA. Insomnia. Ann Intern Med. 2014;161(7):ITC1.

7. Ferre Navarrete F, Vilches Aguirre AND. Diagnosis and treatment of the insomnia. Medicine (Baltimore). 2012;11(23):1406–11.

8. Hammond D, Reid JL, Zukowski S. Adverse effects of caffeinated energy drinks among youth and young adults in Canada: a Web-based survey. C Open. 2018;6(1):E19–25.

9. Ibrahim NK, Iftikhar R. Energy drinks: Getting wings but at what health cost? Pakistan J Med Sci 2014;30(6):1415–9.

10. Tsvetkova DD. Investigation of Some Pharmacological Effects of Caffeine and Taurine in Food Supplements. Int J Nutr Food Sci. 2015;4(1):18.

11. Vélez JC, Souza A, Traslaviña S, Barbosa C, Wosu A, Andrade A, et al. The Epidemiology of Sleep Quality and Consumption of Stimulant Beverages among Patagonian Chilean College Students. Sleep Disord. 2013;2013:1–10.

12. Sanchez SE, Martinez C, Oriol RA, Yanez D, Castañeda B, Sanchez AND, et al. Sleep quality, sleep patterns and energy drinks

consumption and other caffeinated beverages among Peruvian college students. Health (Irvine Calif). 2013;05(08):26–35.

13. Khamis Ragab Ibrahim N, Iftikhar R, Murad M, Fida H, Abalkhaeil B, To the Ahmadi J. Energy Drinks Consumption amongst Medical Students and Interns from Three Colleges in Jeddah, Saudi Arabia. J Food Nutr Res. 2014;2(4):174–9.

14. Reid SD, Ramsarran J, Brathwaite R, Lyman S, Baker A, Cornish DC, et al. Energy drink usage among university students in a Caribbean country: Patterns of use and adverse effects. J Epidemiol Glob Health. 2015;5(2):103–16.

15. Bastien CH, Vallières A, Morin CM. Validation of the insomnia severity index as an outcome measure for insomnia research. Sleep Med. 2001;2(4):297–307.

16. Fernandez-Mendoza J, Rodriguez-Muñoz A, Vela-Bueno A, Olavarrieta-Bernardino S, Calhoun SL, Bixler EO, et al. The Spanish version of the Insomnia Severity Index: A confirmatory factor analysis. Sleep Med. 2012;13(2):207–10.

17. Morin CM, Belleville G, Bélanger L, Ivers H. The Insomnia Severity Index: psychometric indicators to detect insomnia cases and evaluate treatment response. Sleep. 2011;34(5):601–8.

18. Moayedi F, Shahabjahanlu A, Rasa F, Sadeghi P. prevalence of sleep disorders among medical students. Res J Pharm Biol Chem Sci. 2015;6(2):894–8.

19. Lohitashwa R, Kadli N, Kisan R, Deshpande D. Effect of stress on sleep quality in young adult medical students: a cross sectional study. Int J Res Med Sci Lohitashwa R to the Int J Res Med Sci. 2015;3(12):3519–23

20. Bawazeer NA, Alsobahi NA. prevalence and Side Effects of Energy Drink Consumption among Medical Students at Umm To the-Qura University, Saudi Arabia. IJMS Int J Med Students. 2013;1(3):104–8

21. Marmorstein NR. Interactions Between Energy Drink Consumption and Sleep Problems: Associations with Alcohol Use Among Young Adolescents. J Caffeine Res. 2017;7(3):111–6.

22. Kim SY, Sim S, Choi HG. High stress, lack of sleep, low school performance, and suicide attempts are associated with high energy drink intake in adolescents. PLoS One [Internet]. 2017;12(11):e0187759.

23. Estrella BO, Vigo MG. prevalence of the depression and level of stress en students of the University Continental of Huancayo, Peru. Apunt Cienc Soc. 2016;6(1).

24. Piazza M, Fiestas F. prevalence anual of disorders and use of servicios of mental health en the Peru: results of the study mundial of mental health, 2005. Rev Peru Med Exp Health Publica. 2014;31(1):30–8.

Correspondence to:
Gonzalo Cornejo-Venegas.
Jirón Los Castaños Avenue 236, Casuarinas Sur, Santiago de Sulcus, Lima.
Telephone: 980710446.
E-mail: gonza_cornejo@icloud.com

9