A survey of energy drinks consumption amongst medical students and foundation year doctors in Malta

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Abstract

Objectives: To explore the consumption patterns of energy drinks and associated factors, amongst medical students and foundation year doctors in Malta.

Methods: Data was collected from medical students and foundation year doctors from the Faculty of Medicine and Surgery, University of Malta, by means of an electronically administered cross-sectional, self-reported survey. The response rate was 42% (n=305, M=124, F=181). IBM SPSS 23 was used for statistical analysis.

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Results: Energy drinks consumption amongst the sample was 68.2% (n= 208). Most participants (60.1%) started consuming energy drinks between 16-20 years, followed by those between 11-15 years (34.6%). Males are more likely to consume energy drinks than females. Participants who consume energy drinks are more likely to also drink coffee (85.1%), alcohol (88.0%) and smoke tobacco (18.3%). Common reasons for drinking energy drinks were for mixing with alcohol (37.5%) and during studying/major projects (30.8%). The majority of the participants (52.1%) experience psychological side effects due to energy drinks, the most common being stimulating/hyperactivity (42.6%), followed by anxiety (14.8%). Over half of the participants (54.8%) claimed to suffer from physical side effects

Conclusions: Energy drink consumption is common amongst this population and certain aspects of consumption are a cause for concern. Greater public education of the risks of these drinks is recommended especially to young age groups. Legislation may be required to control the marketing and sales and accessibility of these drinks.

Keywords

Energy drinks, medical students, foundation year doctors, caffeine, anxiety

Introduction

'Energy drinks' is a collective term applied to a vast array of caffeinated soft drinks that invariably claim to boost performance, stamina and endurance.[1-2] Drinks that have purported to increase energy have been available for many decades but it is commonly held that it was the introduction of Red Bull© in the 1980's which pre-empted the widespread availability of such drinks and the consequent increase in their popularity.[2-3]

Energy drinks are usually composed of caffeine, carbohydrates, taurine and water-soluble

vitamins. Other ingredients that may be found in these drinks, such as guranà and kola, may potentiate the caffeine content[4], and the effects of sustained intake of the additives, either alone or in combination with the caffeine, are not established. Energy drinks have been the focus of an abundance of research and review articles within the extant literature and they have both proponents and opponents based on the potential benefits and hazards of these drinks. There is significant debate as to whether energy drinks are safe for consumption.[5] Published research has indicated that energy drinks have been shown to effect significant improvements in mental performance (i.e. reaction time, concentration and memory, a decrease in tiredness), with their effects taking hold within an hour of consumption and being sustained for around 90 minutes.[3,6-7] By far the greatest concern regarding the consumption of energy drinks is the caffeine content. This is by no means standard with some drinks containing as much caffeine as a cup of coffee[8] (around 100mg), right up to as much as 505mg per can[9]. Although previous research has found that low to moderate caffeine doses[7] (up to 200mg), can enhance cognitive performance and mood and positively impact speed, accuracy and alertness[3,7], other studies report that excessive consumption of energy drinks may lead to negative physical effects such as gastrointestinal disturbances, cardiovascular changes[8], and insulin resistance[10], in addition to agitation, anxiety, irritability and insomnia[6]. The effects of energy drinks on mental health is one that has produced somewhat dichotomous findings within the literature[2,11]. Whilst some studies have shown that caffeine has an enhancing effect on mental health other research has found that anxiety, depression and behavioural problems are higher amongst consumers as opposed to non-consumers.[2,11] The difference in effects is invariably related to the levels of caffeine consumed.

Another area of concern is the association between energy drink consumption and increased risk-taking behaviour, most often referring to the common practice of mixing alcohol with energy drinks, the latter masking the effects of the alcohol. Studies suggest that this increases the risk of inappropriate sexual activity, drink driving and other potentially risky behaviour.[8,12]

It is perhaps understandable that young people facing long hours of study and pressure related to exams are attracted by manufacturers' claims that energy drinks are the ultimate study aid, boosting energy, promoting wakefulness, increasing attention span and heightening intellect[1]. Furthermore, since energy drinks are unregulated and are sold alongside ordinary soft drinks, their accessibility may be another attractive feature. Irrespective of the reason, their popularity is undeniable given that they are the fastest growing beverage category and are now available in over 140 countries[9]. Energy drinks account for 1% of the total soft drinks market and this figure is still rising. In Western Europe alone, the energy drink market increased by 12.9% between 2007 and 2011[4]. In 2015 global sales reached €38.2 billion and it is projected that this will increase to €53.4 billion by 2020[13]. Although the literature states that the target demographic for the sale of these drinks is adolescents and young people, particularly males[6], other authors have noted that older consumers are responding to manufacturers' attempts to attract their business by for example, introducing new flavours, diet and sugar free variations[13].

One demographic group that has been the focus of a number of studies examining consumption, reasons for use, and awareness of side effects of energy drinks, is medical students. This attention is seemingly based on the assumption that this particular group would have a greater knowledge and understanding of nutrition and health[1]. However, the collective findings of these numerous studies conclude that the consumption of energy drinks amongst this particular group is widely prevalent,[4,6,8-9,14-16] with a higher rate of use by males.[1,4,10,14-18] The main reasons for consumption are reported to be predominantly related to the energy boosting properties of the beverages, utilised by medical students when studying or sitting for exams. They are also used to allay the need for sleep, and during the course of socialising, commonly being mixed with alcohol.[15-16] Furthermore, several researchers noted an association between energy drinks and the consumption of coffee and smoking.[4,9,17]

The aims of the present study were firstly to determine the consumption patterns of energy drinks amongst medical students and foundation year doctors in Malta and to establish the common reasons for consumption. To date this is not a subject that has been explored within Mediterranean countries. Additionally, this study sought to

establish if there is an association between energy drinks and coffee consumption and tobacco smoking amongst this group. Finally, the study investigated whether a correlation exists between anxiety levels and the consumption of energy drinks.

Methods
Participants

A cross sectional survey was conducted amongst medical students and foundation year doctors from the Faculty of Medicine and Surgery, University of Malta. The sample included students who graduated between 2009 – 2015 (5 cohorts of medical students spanning 5 years, and two years post-graduate 'Foundation' doctors). Data was collected between September 2015 and September 2016.

Procedures

The study was approved by the University of Malta. The questionnaire was disseminated in an online interactive format by the Dean's Office via the Medical School's portal: MMSA (Malta Medical Students Association). Participation was voluntary and responses were completely anonymous.

Instruments

A 34-item questionnaire was developed based on the existing literature. The questionnaire consisted of categorical (nominal or dichotomous) questions. Some of the questions allowed multiple responses. The GAD-7 was incorporated into the main questionnaire. It is a reliable and validated self-reported questionnaire used for detecting probable cases of generalised anxiety. The GAD-7 score is calculated by assigning scores of 0, 1, 2, and 3, to the response categories of 'not at all', 'several days', 'more than half the days', and 'nearly every day', respectively, and adding together the scores for the seven questions. The Generalized Anxiety Disorder Scale (GAD-7) screening tool was developed in 2006.[19]

The questionnaire was piloted on a focus group of 12 medical students and 2 newly graduated doctors. No changes in the questionnaire were identified following piloting. The questionnaire included five sections: the first section asked for demographic information; the second section concerned anxiety (GAD-7); the third section asked

about consumption of energy drinks, the fourth section enquired about coffee consumption and the final section asked about other legal substance use and psychological effects of energy drinks.

Data Analysis

IBM SPSS 23 (Statistical Package for the Social Sciences) was used for statistical analysis. Descriptive statistics were first used to describe the basic features of the data and the sample decomposition. The chi-square test was used to determine whether there was or was not an association between two categorical variables. Cramer's V was used to provide an estimate of the strength of the association between the two nominal variables. *Cohen's kappa (κ) coefficient*[20] was used to determine the agreement of consumption of energy drinks between during and outside study/examination period. Cohen's kappa (κ) can range from -1 to +1. The non-parametric tests, *Mann-Whitney U test* and *Kruskal-Wallis test* were used to compare mean GAD-7 scores between two or more independent groups (e.g. gender, age group, energy drinks consumption, coffee consumption, alcohol consumption and tobacco smoking). A General Linear Model (GLM) was implemented in order to compare how several variables affect the variations in the GAD-7 scores.

Results
Composition of the Sample

726 questionnaires were sent. Response rate was 42 %, of which 40.7% of were males and 59.3% were females. The majority of males were aged between 22 and 25 years (41.9%) followed by those aged between 17 and 21 years (41.9%). More than half of the female participants were aged between 17 and 21 years (55.2%), followed by 39.8% who were aged between 22 and 25 years. The majority of the participants (80.0%, N 246) were medical students. The remaining participants were foundation year doctors (20.0%, N 59).

Consumption of energy drinks

More than half of the participants in the sample (68.2%) consume or have consumed energy drinks in the past. The majority of these started consuming energy drinks between the ages of 16 and 20 years (60.1%). However, approximately one third of those who consume or have consumed energy drinks started consuming them between the ages of

11 and 15 years. Males are more likely to drink energy drinks than are females (82.3% of males as opposed to 58.6% of females) (102 males consumed energy drinks out of 124 in the sample; 106 females consumed energy drinks out of a total of 181 females). There was a statistically significant, moderate association between gender and energy drinks consumption, X^2 (1) =19.049, $p<0.0005$, Cramer's V = 0.25. In contrast, there was no association between age group and energy drinks consumption, X^2 (3)=3.034, p=0.386. The most preferred brand of energy drink consumed was Red Bull©, containing 80mg of caffeine per 250ml (87.0%). More than half of the participants (62.5%) stated that their first consumption was in the context of a social setting, 23.6% consumed them based on recommendations from friends or family and the remainder were attracted to them through advertising (18.3%), or by seeing them on display in a store (15.9%). Multiple responses were allowed when participants were asked how they were first introduced to energy drinks. In a typical session,

most of the participants drink only one energy drink (45.2%), whilst 15.4% prefer to drink two, and 2.9% prefer to drink more than three. The most common reasons for consuming energy drinks were to mix them with alcohol (37.5%) and due to insufficient sleep or to ward off sleepiness and stay awake (17.3%). Furthermore, 30.8% of the participants consumed energy drinks during the time of studying / exams / major academic projects. In fact, Cohen's κ was applied to determine if there was an agreement of consumption of energy drinks between 'during' and 'outside' the study/examination period. Table 1 is showing that, in general, participants increase the consumption of energy drinks during the study/examination period by taking more than 5 energy drinks per month, of whom normally they do not consume any energy drinks outside the study/examination period. Only one third of the respondents stated that the consumption of energy drinks during and outside the study/examination period remain the same.

Table 1: Measure of agreement: Energy drinks consumed during and outside the study/examination period per month

Consumption of Energy Drinks ...			DURING the study/examination period per month						
			1 to 5	6 to 10	11 to 20	21 to 40	> 40	None	Total
OUTSIDE the study/examination period per month	1 to 5	Count	34	15	8	5	0	52	114
		%	56.7%	51.7%	57.1%	41.7%	0.0%	59.8%	54.8%
	6 to 10	Count	4	0	1	3	3	3	14
		%	6.7%	0.0%	7.1%	25.0%	50.0%	3.4%	6.7%
	11 to 20	Count	0	2	1	0	1	0	4
		%	0.0%	6.9%	7.1%	0.0%	16.7%	0.0%	1.9%
	21 to 40	Count	0	0	0	2	0	0	2
		%	0.0%	0.0%	0.0%	16.7%	0.0%	0.0%	1.0%
	> 41	Count	0	0	0	0	0	0	0
		%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	None	Count	22	12	4	2	2	32	74
		%	36.7%	41.4%	28.6%	16.7%	33.3%	36.8%	35.6%
Total		Count	60	29	14	12	6	87	208
		%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

κ = 0.020 (95% CI, -0.066 to 0.106), *p*=0.634

Effects of energy drinks

When asked if they felt that the consumption of energy drinks had influenced their examination results, 47.6% of participants felt that they had made no impact on the results, whilst 33.7% were unsure, and 16.8% claimed that energy drinks had

indeed positively influenced their examination results. Conversely, 1.9% stated that they felt that the consumption of these drinks had a negative impact on their examinations. In relation to side effects, 89.5% of respondents stated that they were aware of the possible side effects associated with

energy drinks and 53.1% claimed to be aware of the contents of the energy drinks they consume. A significant association was found between those who were aware of the different contents of energy drinks and consumption of energy drinks ($\chi^2(1)$=6.720, p=0.010, Cramer's V=0.148). Respondents who were aware of the contents of the energy drinks were more likely to consume energy drinks (58.2%) than those who did not (42.3%). More than half of the participants (54.8%) claimed to experience an increase in frequency of urination and urinary output after consuming the drinks. A high proportion of participants (42.2%) also reported experiencing palpitations; jolt and crash (39.8%), insomnia (31.9%) and headaches (21.1%). When considering psychological effects of energy drinks, 52.1% claimed to have experienced some type of psychological effect, the most common being stimulation / hyperactivity (42.6%), followed by anxiety (14.8%) Respondents who suffered from stimulation / hyperactivity were more likely to drink energy drinks (47.1%) than those who did not (33.0%) ($\chi^2(1)$=5.397, p=0.025, Cramer's V=0.133).

Coffee, cigarettes and alcohol

The vast majority of participants affirmed that they drank coffee (81.3%) and alcohol (82.3%). However, the majority had never smoked tobacco (85.2%). More than half of the respondents (65.7%) claimed that alcohol consumption during the study/examination period. Also, 39.1% claimed that coffee consumption has made no impact on their examination results, whereas 33.9% claimed that consuming coffee had made a positive impact on their examination results. There was no statistically significant association between gender and coffee consumption ($X^2(1)$=0.003, p=0.959) and gender and alcohol consumption ($X^2(1)$=2.351, p=0.503). Moreover, there was no association between age group and coffee consumption ($X^2(3)$=5.081, p=0.166), and between age group and alcohol consumption ($X^2(3)$=3.388, p=0.336). However, there was a statistically significant association between coffee consumption and energy drinks ($X^2(1)$=6.165, p=0.013, Cramer's V=0.14), and a moderately strong association between alcohol consumption and energy drinks, ($X^2(1)$=14.511, p<0.0005,. Cramer's V=0.22. This means that participants who consume energy drinks are more likely to drink coffee and alcohol rather than

respondents who do not consume energy drinks. Of the 14.8% of participants who did smoke, the majority were male and of all smokers, 66.7% claim that their cigarette intake increased during periods of study / exams. There was a statistically significant, small association between gender and tobacco smoking, $X^2(1)$=10.176, p=0.001, Cramer's V=0.18, where male respondents were more likely to smoke rather than female respondents. There was no association between age group and tobacco smoking, X^2 (3)=2.351, p=0.503. In addition, a statistically significant, small association was found between tobacco smoking and energy drinks consumption, $X^2(1)$=6.425, p=0.007, Cramer's V=0.15.

Mental health

The majority of the respondents (88.5%) never suffered from pre-existing psychological/psychiatric conditions. Almost all of the participants stated that they were not taking any psychiatric medication (95.0%). Amongst those on medication, the most common type was antidepressants. With respect to the GAD-7 test, participants' scores were categorised as follows: 0-5 as 'No/Little anxiety', 6-10 as 'Mild anxiety', 11-15 as 'Moderate anxiety' and 16-21 as 'Severe anxiety'.

The analysis revealed that the majority of the responses (56.7%) are indicative of little or no anxiety, 23.9% of the participants are indicative of mild anxiety,12.8% of the participants are indicative of moderate anxiety and 6.6% of the participants are indicative of severe anxiety (Table 2).

A General Linear Model (GLM) was modelled in order to analyse collectively the contribution of each predictor in explaining the variations in the GAD-7 scores. The response variable in this study was the GAD-7 score and this was related to seven predictors, namely: gender, age group, marital status, coffee consumption, tobacco smoking, alcohol consumption and energy drinks consumption. The GLM identified only one predictor – gender, as contributing significantly in explaining variation in the GAD-7 scores (p-value 0.025). Gender emerged as the strongest predictor for higher GAD-7 scores since it had the smallest p-value (0.025). The remaining predictors age group, marital status, energy drinks consumption, coffee consumption, tobacco smoking and alcohol consumption were found to be weak predictors

since their p-values exceeded the 0.05 level of significance (Table 3). These predictors were removed from the model fit since their contribution in explaining variation in the response outcomes was negligible.

Table 2: *GAD-7 Classification: Level of Anxiety in Participants*

Score	Counts	Percent	Classification
0-5	173	56.7%	No/Little anxiety
6-10	73	23.9%	Mild anxiety
11-15	39	12.8%	Moderate anxiety
16-21	20	6.6%	Severe anxiety
Total	305	100.0%	

Table 3: *Tests of Model Effects*

	Wald Chi-Square	Degrees of Freedom	P-value
(Intercept)	21.072	1	0.000
Gender	4.999	1	0.025
Age Group	1.745	3	0.627
Marital Status	0.927	2	0.629
Energy Drinks consumption	0.002	1	0.968
Coffee consumption	0.040	1	0.842
Tobacco smoking	1.289	1	0.256
Alcohol consumption	0.771	1	0.380

Thus, the GLM was re-fitted using Gender as the only predictor.

The parsimonious regression model with Gamma identity link function with GAD-7 score as the dependent variable is as follows:

Predicted GAD-7 score = 7.116 - 1.400*Male

The parameter estimate of males is -1.400, which implies that the expected GAD-7 score of males is 1.4 points lower than the expected GAD-7 score of females. Also, the Mann-Whitney U test revealed that the mean GAD-7 scores amongst the sample differed significantly on gender only (U=9305, Z=-2.542, *p*=0.011). Females had significantly higher mean GAD-7 scores (Mean=6.45 ± 0.78) than their male counterparts (Mean = 5.02 ± 0.86). Of particular interest in this study was the finding that the groups with the lowest mean GAD-7 scores were participants aged between 26-30 years (Mean=5.25±1.96), participants who consume energy drinks (Mean=5.65±0.70) and alcohol (Mean=5.74 ± 0.63) and those who do not drink coffee (Mean=5.33±1.29) or smoke tobacco (Mean=5.78± 0.63).

On the other hand, the groups with the highest mean GAD-7 scores were participants aged over 40 years (Mean=11.50 ± 31.77), participants who do not consume energy drinks (Mean=6.34 ± 1.06) and alcohol (Mean=6.48 ± 1.49), those who drink coffee (Mean=5.99± 0.66) and smoke tobacco (Mean=6.38± 1.50).

No association was found between energy drinks consumption and anxiety levels, $X^2(3)=1.823$, *p*=0.610.

Discussion

The findings of this study have many commonalities with similar research conducted in countries such as Poland,[12,15] Turkey,[17] Saudi Arabia,[9-10,14,18] Italy,[4] Nigeria,[6] Serbia,[16] and the USA[3]. Energy drinks consumption is found to be common amongst medical students and junior

doctors in Malta;[1,3,6,8,9,12,15-16] consumption is higher amongst males[1,9-10,12,14,16-18] and commencement of consumption started at a young age.[9] Strikingly, one third of participants in this study started drinking these beverages between the very young ages of 11 and 15 years. In Malta, the teenage years are the time when youngsters start to socialise without parental supervision during weekend evenings in the Island's entertainment areas. Since the majority of participants reported first consuming energy drinks in a social setting (62.5%) it is likely that it is at this point of their lives that they are exposed to the drinks and to the possibility of mixing them with alcohol. Added to the fact that targeted advertising of the drinks is extremely attractive to younger age groups, the uncontrolled availability and sales of energy drinks is an area which needs urgent reform.

Typically, the majority of participants only drink one energy drink per session which, depending on the brand, may not amount to more caffeine than can be found in one cup of coffee, with only a small proportion of the sample consuming more than three energy drinks in each session. Other studies have shown that mixing energy drinks with alcohol is a known factor,[3-4,12,15,17] however in this study, it was the highest rated reason for consumption of the drinks and this raises serious concerns related to an increase in risky behaviour. In addition, consistent with other studies,[4,17] cigarette smoking, and coffee and alcohol consumption are clearly correlated to consumption of energy drinks. These findings are consistent with those of other studies that identify an association between the consumption of energy drinks and other potentially harmful or risky legal substances.

Locally as elsewhere, energy drinks are also utilised as a study aid (mental agility)[12,15] and less commonly, as a means to stay awake.[12] Interestingly, most of the participants (75.0%) who stated that they consumed the drinks as a means of improving mental agility and concentration in order to study, could not definitively say whether the drinks had a positive impact on their exams, so their consumption was not based on or reinforced by personal experience.

Increased knowledge about the potentially harmful effects of legal substances is apparently not a deterrent amongst this group, despite the participants having a potentially greater knowledge of physiological and medical aspects than their non-medical peers. This finding supports those found in other studies.[12,16] It is suggested that in the case of energy drinks, this is due to the desired effects of the drinks outweighing the negative side effects experienced.

Analysis of the GAD-7 scores showed that unlike other studies[4], no association was found between the consumption of energy drinks and anxiety levels and furthermore it was found that participants who consume energy drinks rank lower on the GAD-7 score.

Limitations of the study

The survey design employed in this study i.e. self-report questionnaires, may be considered as a limitation, as this method can be affected by recall bias and reporting errors. A further limitation is a lack of collected data related to the participants' clinical history, metabolic assessment, pressure profile and cardiac frequency, since the inclusion of such data would have added depth to the participants profile and enriched the results. Had the study considered participants' use of other substances which may have a synergistic effect on caffeine products, this would have added another point of interest to the study. Furthermore, since this study was conducted amongst medical students and foundation year doctors, who may be assumed to have greater knowledge of nutrition and health, the results may not be generalizable to students from other areas.

Conclusions

This study demonstrated a widespread use of energy drinks amongst medical students and foundation year doctors in Malta. Knowledge, awareness and personal experience of side effects did not act as a deterrent to consumption. Mixing energy drinks with alcohol is common and cigarette smoking and caffeine consumption are also both correlated to the consumption of energy drinks. Participants reported an increase in consumption of energy drinks around the times of exams and increased studying. Educational bodies should investigate ways in which to help students cope with the pressures of course work in a safer manner. No association was found between energy drinks and anxiety. The young age at which the participants started consuming energy drinks is startling and indicates a strong educational need to

provide awareness and education to young people of school age, regarding the active ingredients of the drinks and their potential risks and negative effects. Although the literature is divided in terms of the potential risks associated with energy drink consumption, several studies have found there to be real cause for concern related to both known and unknown effects of the drinks. For these reasons a pressing need for more informed studies to assess the need for legislative intervention and control regarding the sale of energy drinks is recommended. Moreover, this subject is under researched in the local context and as described earlier the research sample in this study was a narrowly defined group, therefore further research which examines wider population samples is highly indicated.

Acknowledgements

References

1. Usman A, Bhombal S, Jawaid A, Zaki S. Energy drinks consumption practices among medical students of a Private sector University of Karachi, Pakistan. Journal of Pakistan Medical Association. 2015;65(9):1005-7.
2. Richards G, Smith A. A Review of Energy Drinks and Mental Health, with a Focus on Stress, Anxiety, and Depression. Journal of Caffeine Research. 2016;6(2):49-63.
3. Malinauskas B, Aeby V, Overton R, Carpenter-Aeby T, Barber-Heidal K. A survey of energy drink consumption patterns among college students. Nutrition Journal. 2007;6(35).
4. Casuccio A, Bonanno V, Catalano R, Cracchiolo M, Giugno S, Sciuto V, et al. Knowledge, Attitudes, and Practices on Energy Drink Consumption and Side Effects in a Cohort of Medical Students. Journal of Addictive Diseases. 2015;34(4):274-83.
5. Hoyte C. The toxicity of energy drinks: myth or reality? Clinical Toxicology (Philadelphia). 2013;51(8):729-30.

6. Jimoh A, Bakare A. Prevalence of Stimulant Drinks Consumption among University Students in North Western Nigeria. International Journal of Innovative Research & Development. 2014;3(4):488-92.
7. Ishak W, Ugochukwu C, Bagot K, Khallili D, Zaky C. Energy drinks: Psychological Effects and Impact on Well-being and Quality of Life - A Literature Review. Innovations in Clinical Neuroscience. 2012;9(1):25-34.
8. Aslam H, Mughal A, Edhi M, Saleem S, Rao M, Aftab A, et al. Assessment of pattern for consumption and awareness regarding energy drinks among medical students. Archives of Public Health. 2013;71(31):1-11.
9. Ibrahim N, Iftikhar R, Murad M, Fida H, Abalkhaeil B, Al Ahmadi J. Energy Drinks Consumption amongst Medical Students and Interns from Three Colleges in Jeddah, Saudi Arabia. Journal of Food and Nutrition Research. 2014;2(4):174-9.
10. Bawazeer N, AlSobahi N. Prevalence and Side Effects of Energy Drink Consumption among Medical Students at Umm Al-Qura University, Saudi Arabia. International Journal of Medical Students. 2013;1(3):104-8.
11. Trapp. GS, Allen. K, TA OS, Robinson. M, Jacoby. P, WH O. Energy drink consumption is associated with anxiety in Australian young adult males. Depression and Anxiety. 2014;31(5):420-8.
12. Cencek P, Wawryk-Gawda E, Samborski P, Jodlowska-Jedrych B. Energy drinks - consumption and awareness among students of Medical University of Lublin. Current Issues in Pharmacy and Medical Science. 2016;29(4):190-4.
13. Starling S. Beveragedailycom [Internet]2016 16 June 2016. [accessed 7th September, 2017]. Available from: www.beveragedaily.com/Markets/The-world-s-unquenchable-thirst-for-energy-drinks.
14. Mustafa A, Al-Hamdan N, Saeed A, Al-Yousef A, AlMahfouz N. A Survey of Energy Drink Consumption among Medical Students in the Faculty of Medicine King Fahed Medical City, Saudi Arabia. Weber Medicine & Clinical Case Reports. 2015;1(2):171-6.
15. Chuda A, Lelonek M. A survey of energy drink consumption patterns among 4th and 5th year students of Faculty of Medicine, Medical University of Lodz. Folia Cardiologica. 2015;10(3):149-56.
16. Parezanovic G, Prkosovacki B. Energy drink consumption among medical high school students in Serbia. Paediatria Croatica. 2016;60:85-90.
17. Hidiroglu S, Tanriover O, Unaldi S, Sulun S, Karavus M. A survey of energy drink consumption among medical students. Journal of Pakistan Medical Association. 2013;63(7):842-5.
18. Ghreiz. S, Ali. S, Refaie. S, Alshamrani. A, Al-Mulhim. N, A-Mulhim. A, et al. Awareness toward Energy Drinks among Medical Students in King Faisal University. International Journal of Healthcare Sciences. 2016;3(2):295-9.
19. Spitzer. R, Kroenke. K, Williams. J, B. L. A Brief Measure for Assessing Generalised Anxiety Disorder: The GAD-7. Archives of Internal Medicine. 2006;166(10):1092-7.
20. Cohen. J. A Coefficient of Agreement for Nominal Scales. Educational and Psychological Measurement. 1960; 20, 37-46.
21. Cohen. J. Statistical power analysis for the behavioral sciences (2nd ed.). New York, NY: Psychology Press. 1988.