



Relationship among Perceived Stress, Academic Performance and use of Energy Drinks: A Study on Universities' and Medical Students of Khyber Pakhtunkhwa Province of Pakistan

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ABSTRACT

This study examined the relationship between perceived stress, academic performance participants and pattern of energy drink consumption in the context of higher education universities and medical students of Khyber Pakhtunkhwa province of Pakistan. Primary data was collected through self-designed questionnaires including the perceived stress scale and question about energy drink consumption, academic performance and demographics. Convenient sampling was used to select the universities and medical colleges of the province. To obtain the participants of study, random sampling technique was used. Consistent with the study hypotheses, the relationship existed between perceived stress and selected energy drink consumption items. Participants' perceived stress and academic performance was negatively correlated. The relationship between participants' perceived academic performance and energy drinks consumption was also found. It was found that medical students used more energy drinks as compare to non-medical students. There is a significant difference between male and female energy drink users. The participants who study in private sector institutions consume more drinks as compared to public sector students per month. More stress was found in female participants as compare to male. Comparatively medical students' stress level is high then non-medical students. Similarly stress level increases as one move from junior to senior level at his/her college or university.

Keywords: Perceived Stress, Academic Performance, Energy Drink Consumption, Higher Education Institutes, Pakistan

JEL Classifications: C83, M10

1. INTRODUCTION

Perceived stress is a condition in which someone feels or perceives that the situation or a problem he/she is facing is more than the skills possess during the specific timer period (Li et al., 2014). During the college or university life students faced different type of challenges related to their education, social life, financial concerns and other related issues. For almost every student college life is full of stress as they have to face new environments related to their education and social life (Towbes and Cohen, 1996). During the study students faced different challenges full of stress at college. And when someone fail to deal properly different type of consequence including non-proper sleep, feeling alone, and nervousness and different other problems occurs (Wright, 1967).

If someone is under the stress condition, it is hard to satisfy his self in that environment (Lee, 2011). To measure the degree of stress perceived stress scale (PSS) is used by psychologist and researcher worldwide. Psychological stress refers to the degree in which someone perceives that the situation he is facing is more than his abilities to handle (Cohen et al., 1983). Students' academic performance and the levels of stress from moderate to high was analyzed and a more comprehensive approach was adopted and it was found out that examinations stress, grade point average and or failing fear were the most common variables among stress inducers while author further elaborated that coping these stress variables well and managing them in an effective manner and also faculty involvement with students in relieving the stress influencers are the better tools for optimum academic (Polychronopoulou and Divaris,

2009). According to American College Health Association's National College Health Assessment, stress is among the top five threats to academic performance. Various university and college students put their health at risk because of craving for energy drinks usage and more consumption during their daily routine life. Many researchers investigated that low quality ingredients usage and lack of compliance to regulations or in the absence of regulation for these energy drinks are improvising problems in the general public (Reissig et al., 2009). Some explorers made their suggestion that non-compliance to rules and regulations, energy drinks are marketed by many entities with aggressive and invasive nature, adjuring specifically the young and among them particularly the males pursuing performance elevation and other factors relative to stimuli. Some of the well-known brands of energy drinks are Red Bull, Monster, String, Boosts, etc. Different ingredients are included in these energy drinks, not only these but also include, carbohydrates and taurine (i.e., an amino acid which is established for the promotion of neurological development water regulation along with mineral salt concentrations in blood) (Zeratsky, 2010).

The beverages that claim to provide prompt energy are called energy drinks. These drinks are made by combination of caffeine, different type of vitamins and plant-based stimulants. The results and reactions of these elements are somewhat understood (O'Brien et al., 2008). After the debut of Red Bull in 1997, these energy drinks got popularity. Red Bull is market leader in energy drinks niche. Although the young people are the target marked to these drinks, a very little research is conducted on college students to know the consumption pattern in USA (Malinauskas et al., 2007).

In a country like Pakistan, the trends in young generation are changing continuously because of fast growing environment. The young generation mostly tries to copy the western culture, and use of these energy drinks are also the part of western society. As the time passes, energy drinks got popularity in Pakistan young generation in general and particular in universities and medical students. These energy drinks are in different size, packing, and pricing as well. Imported energy drinks two to three times more costly than local manufactured drinks. Different energy drinks brands being use in Pakistan includes Red Bull, Monster, Sting, Boost, Speed Energy, Sparks, Rockstar, Max, etc.,

In this study, we selected the students of different universities and medical colleges located in jurisdiction of Khyber Pakhtunkhwa (KPK) Province of Pakistan. These institutions are divided into two main categories (general or non-medical category universities and medical colleges). Further each main category is divided into two sub category (public and private sector universities and public and private sector medical colleges). The data was collected in November and December-2014, and at the time in the province there were 20 public sector and 10 private sector universities in general category. In medical colleges category there are 08 public sector and 09 private sector medical colleges in the province.

2. LITRATURE REVIEW

College or university life is a major evolution in students' lives since they got the chance to make decisions without the direct influence of

their parents. The Students are free to decide about their education, live style, and other related activities. Similarly, on the other hand they face variety of stressor mainly linked to academic stress which effects their performance and health. A study conducted in 1969 on 133 entering male medical students concluded that; students who reported more stress performed less well academically than those who reported less stress (Gottheil et al., 1969). Students who exhibited more external control in their personalities are likely to feel more unfavorable stress compared with other students. Low self-esteem is also associated with unfavorable stress but did not directly correlate with any of the performance areas except oral examines (Linn and Zeppa, 1984). A research on 100 students at Midwestern University identified top five sources of stress by using student stress survey. These are; variation in sleeping habits, vacations/breaks, time change in eating habits, over work load, and new job responsibilities (Ross et al., 1999).

High perceived stress results in low academic performance and *viz.* Level of perceived stress differs depending on the courses which the students are learning and also there are gender related differences. Female students were found to have greater levels of stress and more health problems (Renev et al., 2015). A research on 200 students of various schools of Meerut, India explore that there are four components through which we can measure academic stress. These are frustration, conflict, study presser and anxiety (Gupta et al., 2011). If the stress is not dealt properly different consequences both positive and negative may occur. The work settings vary from academic institutions to non-academic, so as their symptoms and causes of stress are different (Pandya et al., 2012). In a society there are different opinions and false perceptions about the benefits and some drawbacks of energy drinks. There is also a strong need of legislation regarding mandatory labeling of exact caffeine content of these drinks and with strong health warning regarding potential health risks (Usman and Jawaid, 2012). While examining the academic performance of the student against moderate, negative and significant association, a number of variables were considered and their association was confirmed by asserting that a strong link connects all of them. It was also highlighted that a very high and significant levels of stress was present and student's poor and bad performance was the result of these significant levels of stress present in their personalities (Nudart, 2013).

Since 1997, when Red Bull entered in a market, energy drinks consumption is increasing day by day. Throughout the world, these energy drinks are produced are marketed for young generation. About 66% user of these drinks are between the ages of 13 and 35 years, and the males are roughly 65% users and females are 35% (Morris, 2006). A research conducted by state wide Patient Poll in 2008 by the Pennsylvania Medical Society's Institute for Good Medicine concluded that: One-fifth of respondents are between the age of 21 and 30. They had used energy drinks in high school or college in order to stay awake longer for study, or to write a paper. And around 2/3 of respondents are witnessed someone who are using these drinks to stay awake longer to study or work (Report Linker, 2013). Energy drinks like Red Bull contains three main ingredients; taurine, glucuronolactone and caffeine. Each of these three ingredients has side effects that vary in severity, and become worse when interact with each other (Laquale, 2007).

In North Carolina a web-based survey was conducted in 10 universities with random sample of 4271 students. The survey found that almost one-quarter of students who use these drinks mixed alcohol in these drinks. The alcohol-related issue are at high level in these students although they had adjusted the quantity of alcohol consumed (O'Brien et al., 2008).

Pettit and DeBarr (2011) studied the relationships in college students regarding perceived stress, energy drink consumption, and academic performance. The results show that there is a positive relationship between participants' perceived stress and energy drink consumption. Participants' energy drink consumption and academic performance were negatively correlated. A male uses more energy drinks as compare to females. The use of energy drinks also varies from gender to gender and there is a need for education regarding use of energy drinks in response to perceived stress. Another study by Bawazeer and ALSobahi (2013) concluded that male students consume significantly more energy drinks than females. The students consumed energy drinks to get energy in general and while studying for exams or finishing a project. Other reasons given include, lack of sleep, just to be like friends, or driving. Approximately one-third of the consumers manifested some side effect after consumption.

3. METHODS

3.1. Population

In this study, we selected the students of different universities and medical colleges located in jurisdiction of KPK Province of Pakistan. These institutions are divided into two main categories (general category universities and medical colleges). Further each main category is divided into two sub category (public and private sector universities and public and private sector medical colleges).

In KPK, in general category there are 20 public sector and 10 private sector universities. There are 08 public sector and 09 private sector medical colleges in the province. So, these 47 institutions were research population.

3.2. Sample

On the basis of simple formula of $1/3$, out of these 47 institutions 16 institutions (10 universities and 06 medical colleges) were selected as sample size.

3.3. Sampling Technique

Convenient sampling technique was used for data collection. Those institutions which were easily accessible were targeted as sample.

3.4. Participants

The universities' students and medical colleges was the audience of study. 480 questionnaires were distributed for data collection (30 questionnaires was sent to each universities). Participants were selected on random sampling basis.

3.5. Response Rate

Response rate from every institution was different, out of 480 questionnaires 421 was returned, 11 questionnaires was incomplete which were treated as null. So 410 questionnaires

were complete and overall response rate was 85%. Out of 410 respondents 54% ($n = 221$) were male, while 46% ($n = 189$) were female students. Non-medical students were 252 (62%) and medical students were 157 (38%).

3.6. Research Methodology

Data for this study were collected via a survey designed to ascertain information regarding demographics, energy drink consumption, perceived stress, and academic performance. A 10 items PSS was used to assess the stress level of respondents. Each item of the PSS is measured via a 5-point Likert scale (0 = Strongly disagree to 4 = Strongly agree). A 5-point Likert scale was used to assess the academic performance of participants. The same scale was also used to get the data about energy drink consumption.

3.7. Data Analysis

Data was analyzed by using the following statistical tools:

- Frequencies and percentages were used to describe the sample and participants energy drink consumption
- Measure of central tendency and dispersion was described participants' perceived stress and energy drink consumption
- Pearson correlation coefficient was used to assess relationship among variables.

4. RESULTS AND DISCUSSION

During survey, we find that out of 410 respondents 54% ($n = 221$) were male, while 46% ($n = 189$) were female students. Non-medical students were 252 (62%) and medical students were 157 (38%). Less than half of the respondents (48%) were in between the age of 21 and 23 years, whereas one third of the respondents ($n=138$) were under the age of 20 years. Most consumable energy drink was Sting (45%) followed by Red Bull (29%), the reason behind this would be the price factor as the Red Bull price is four times of Sting. In a response to the question, "In an average month, over the last year, have you been drinking energy drinks about" highest number of respondents ($n=105$) tick on "Once a week" option followed by 100 respondents who has been using "once or twice a month." Over 20% respondents ($n=88$) said they use these drinks "once or twice a week." Table 1 shows the descriptive statistics of the variables.

Perceived stress questions were coded from 0 to 4 (0 = Almost never, 1 = Never, 2 = Sometimes, 3 = Fairly often, 4 = Very often). The mean value of perceived stress is 2.16 and standard deviation 0.561. Perceived academic performance questions were coded from 1 to 5 (1 = Almost never, 2 = Never, 3 = Sometimes, 4 = Fairly often, 5 = Very often). The mean value of perceived academic performance is 2.81 and standard deviation is 0.649. Energy drink consumption questions were coded from 1 to 5 (1 = Rarely, 2 = Once/twice a month, 3 = Once a week, 4 = 2 or 3 times a week, 5 = Daily). The mean value of this pattern is 3.17 and standard deviation is 0.287. After analyzing the descriptive statistics the concerned variables, we move to the correlation matrix. Table 2 shows the Pearson correlation between perceived stress, energy drink consumption and academic performance.

The results show s statistically significant inverse relationship was found between perceived stress and academic performance

($r = -0.249$, $P = 0.000$). The correlation between energy drink consumption and academic performance was found positive relation with each other, the value is ($r = 0.618$) and also 1% significance. We can conclude that when students are in stress, their academic performance down and in order to cope the perceived stress they use more energy drinks which in result increase the academic performance. Table 3 shows the comparison of monthly

Table 1: Descriptive statistics

Variables	Min	Max	Mean	Standard deviation
Perceived stress	0	4	2.16	0.561
Perceived academic performance	1	5	2.81	0.649
Energy drink consumption	1	5	3.17	0.287

Table 2: Correlation matrix

Variables	Perceived stress	Energy drink consumption	Academic performance
Perceived stress	1	0.473**	-0.249**
Energy drink consumption		1	0.618**
Academic performance			1

**Correlation is significant at the 0.01 level (two-tailed)

Table 3: Average monthly energy drink consumption (in canes)

Consumption pattern	Number of consumer		Consumption %		Monthly cane consumed		Average consumption/month (cane)	
	Md	Nd	Md	Nd	Md	Nd	Md	Nd
Medical/non-medical								
Everyday	10	22	6.37	8.70	191	261	19.11	11.86
2-3 days a week	31	57	19.75	22.53	237	270	7.64	4.74
Once a week	38	67	24.2	26.48	97	106	2.55	1.58
Once or twice/month	44	56	28.03	22.13	56	112	1.27	2.00
Rarely	34	51	21.66	20.16	22	51	0.64	1.00
Total	157	253	100	100	603	800	3.84	3.16
Male/female								
	M	F	M	F	M	F	M	F
Everyday	20	12	9.05	6.37	271	190	13.57	15.87
2-3 days a week	51	37	23.08	19.58	277	235	5.43	6.35
Once a week	62	43	28.05	22.75	112	91	1.81	2.12
Once or twice/month	55	45	24.89	23.81	50	48	0.90	1.06
Rarely	33	52	14.93	27.51	15	52	0.45	1.00
Total	221	189	100	100	725	616	3.28	3.26
Public/private sector universities								
	P	Pr	P	Pr	P	Pr	P	Pr
Everyday	15	7	8.33	9.59	250	288	16.67	41.1
2-3 days a week	49	8	27.22	10.96	327	132	6.67	16.44
Once a week	48	19	26.67	26.03	107	104	2.22	5.48
Once or twice/month	35	21	19.44	28.77	39	58	1.11	2.74
Rarely	33	18	18.33	24.66	18	25	0.56	1.37
Total	180	73	100	100	741	605	4.11	8.29
Public/private sector medical colleges								
	P	Pr	P	Pr	P	Pr	P	Pr
Everyday	15	7	6.98	5.63	209	169	34.88	42.25
2-3 days a week	49	8	16.28	23.94	195	287	13.95	16.90
Once a week	48	19	23.26	25.35	93	101	4.65	5.63
Once or twice/month	35	21	34.88	19.72	70	39	2.33	2.82
Rarely	33	18	18.6	25.35	19	25	1.16	1.41
Total	180	73	100	100	586	623	6.81	8.77

Md: Medical, Nd: Non-Medical, M: Male, F: Female, P: Public sector, Pr: Private sector, Everyday: 30, 2-3 days a week: 12, Once a week: 4, Once or twice month: 2, Rarely: 1

energy drink consumptions (in canes) of different categories of respondents.

The average monthly consumption of medical students is 3.84/cane per month, whereas non-medical students consume 3.26/cane per month. This shows that medical students consume 17% more drinks in a month. The consumption pattern of male and female respondents is almost same as male students consumed 3.28 canes in month and female consume 3.26 canes. Respondents of private sector universities drink almost double (8.29 canes) in a month as compare to public sector universities (4.11 canes). Similarly students of private medical colleges consume almost two canes more than public sector medial students. Table 4 shows the overall perceived stress score of the respondents.

More than half of the participants were at very high level of stress ($n = 226$). Almost one third ($n = 141$) of the respondents' stress level is slightly high then average. Similarly, only 08% respondents are at average stress level. However, only 2.5% respondents have very or slightly low stress level then average. Table 5 shows the comparison of stress level among different categories of respondents.

By comparing the gender based stress level, it is observed that female respondents stress level is high as compared to male

Table 4: Overall perceived stress score

PSS Score	Stress level	Number of respondents	Percentage
0-7	Very low	2	0.49
8-10	Slightly low	8	1.95
12-15	Average	33	8.05
16-20	Slightly high	141	34.39
21 and above	Very high	226	55.12
Total		410	100

Table 5: PSS score

PSS score	Number of respondents		Percentage	
Medical/non-medical	Md	Nd	Md	Nd
0-7	1	1	0.64	0.40
8-10	3	18	1.91	7.11
12-15	14	19	8.92	7.52
16-20	56	86	35.67	33.99
21 and above	83	129	52.87	50.98
Total	157	253	100	100
Male/female	M	F	M	F
0-7	2	0	0.9	0.00
8-10	9	4	4.07	2.14
12-15	19	12	8.59	6.34
16-20	83	72	37.56	38.09
21 and above	108	101	48.88	53.43
Total	221	189	100	100
Juniors/seniors	Jr	Sr	Jr	Sr
0-7	6	3	3.43	1.28
8-10	10	5	5.71	2.13
12-15	14	19	8.00	8.09
16-20	62	68	35.43	28.94
21 and above	183	140	47.43	59.57
Total	175	235	100	100

Md: Medical, Nd: Non-medical, M: Male, F: Female, Jr: Junior, Sr: Senior, PSS: Perceived stress scale

respondents. Female respondents' very high stress level is 05% more as compared to male respondents. Similarly there is no female at very low stress level and four respondents is at slightly low stress level then average. On the other hand over 5% male respondents are at the same level of stress. In contrast, female are 2% less slightly high level of stress as compared to male respondents. Similarly, in comparisons of medical and non-medical respondents it is concluded that the stress level of medical students are high as compared to non-medical students, although the difference is not very significant So we can say that medical study is more stressful then non-medical course of study.

It was noted that stress level increases as the students' moves from beginning to end. There is more stress found in seniors as compared to juniors, especially seniors have 12% more very high level of stress as compared to juniors.

5. CONCLUSIONS

The objective of the study is to examine the relationship between perceived stress, academic performance and energy drink consumption in high education institutes of KPK province of

Pakistan. The study found a positive relation between energy drinks consumption and perceived stress whereas weak relation was noted between the consumption of energy drinks consumption and perceived academic performance of the students. There was negative relation found between perceived stress and academic performance of the participants.

On the basis of extensive survey on the given area of research, we find some more interesting findings, which are as follows:

1. Medical students consume more drinks (3.84 cane/month) as compare to non-medical students (3.16 cane/month).
2. Similarly male participants used more drinks (3.28 cane/month) as compare to female respondents (3.26 cane/month). Although the difference is very minor, so it is concluded that gender has no effect on consumption of energy drinks.
3. Private sector universities' students consume almost double (8.29 cane/month) energy drinks as compare to public sector universities' students (4.11 cane/month).
4. Respondents of public sector medical college use 6.81 cane/month, whereas private sector medical participants used 8.77 cane/month. So, it is concluded that private sector medical students monthly consume about two cane more than public sector medical students.
5. Over one third of the respondents were (n = 141) at slightly high stress level. Similarly more than half of the participants (n = 226) were at very high level of stress.
6. Female respondents' stress level was high than male respondents. About 38% female was at slightly high stress level and 53% at very high stress level. Whereas, male respondents were 37%, and 49% at the same level of stress respectively.
7. Medical respondents has more stress (slightly high 35%, very high 53%). However, non-medical respondents have comparatively less stress (slightly high 34%, very high 51%). So, it is found that course of study has no significant effect on stress level of students.
8. The junior students (1-2 years at college/university) has less level of stress (very high 47%) as compared to (very high 59%) of those who spend more time in college or university.

5.1. Limitations

The study was conducted on universities and medical colleges in jurisdiction of KPK province of Pakistan only. More accurate findings can be found if these were spread all over the Pakistan. Time frame was also limited. The exploratory analysis was conducted in the study thus, statistical implications were limited. The study was conducted on universities students, the same can also conduct on professionals and corporate sector.

5.2. Future Recommendations

On the basis of above mentioned facts and figures and the information which we gathered from students of different universities in KPK, some of the recommendations which can improve the existing situations i.e., student productivity and efficiency can be achieved by knowing the consumption behavior and factors of energy drinks consumption, so it should be proposed and consumed according. There should be proper workshops, seminars and guidance for students in order to cope with academic

stress. Students must be participated in co-curriculum activities in order to release academic stress. There is need to conduct the same research on faculty members of universities and medical colleges in order to know the stress and their performance relationship.

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