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Original Article

Prevalence of Caffeine Intake among Cigarette Smokers: Directing Caffeine Use Disorder among Pakistani Population

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Abstract

Background: Caffeine is the most commonly used psychoactive drug, being widely enjoyed and open handedly taken all around the world. The use of tea, coffee, soft drinks, chocolates etc is quite common without any sort of consideration to its overuse and lethal impact on health. Persistently inclusive findings suggested a direct relationship between caffeine use and cigarette smoking. Accordingly, intake of caffeine and nicotine is always recognized as a formidable combination, intimidating the survival of smokers.
Objective: The present study was designed to explore prevalence of the prospect caffeine use disorder among cigarette smokers along with demographic considerations.
Methodology: It was a qualitative study having sample of 30 cigarette smoker students, with the age ranged from 16 to 25 years being interviewed from Islamabad and Rawalpindi. Caffeine Use disorder checklist was developed on the basis of DSM-V criteria as an interview guide. The first four items of the check list reflects the symptoms from DSM-V, essential for diagnosing the problem.
Results: Results showed that 47% were suffering from caffeine use disorder. Out of 30 individuals 14 were found to be addicted to caffeine. Furthermore, the findings of the study showed that the addiction is higher among the individual who were older in this sample.
Conclusion: The study has the implication for the mental health professionals for devising the intervention plan and for reducing the health threatening impact of such addictions.
Key words: Caffine, addiction, cigarrete smokers, DSM-V, psychoactive drug.

Introduction

The stimulant obtained from more than 60 different types of plants across the globe is being widely recognized as caffeine. It is considered to be the most commonly used psychoactive drug in the world and a great number of adults are usually found to be inclined towards its usage on a daily basis. Whereas, after the indication of DSM-V towards the threat of caffeine use disorder, a good piece of research was conducted on the health benefits and consequences it holds for the consumers. Coffee, soda, tea, chocolate, soft drinks etc are the most common sources of caffeine in diet. The effects of caffeine persist for about three hours or less.[1]

Tea and coffee are the major sources of caffeine. Caffeine is also found in small concentrations in cocoa, and in caffeinated soft drinks. Coffee originates from Ethiopia. It was in widespread use throughout the Islamic world by the end of the 15th century. A couple of centuries later, Europeans started cultivating the plants in their colonies. The history of tea is considerably older, since it was already being planted and processed in China around the 3rd century AD. It is estimated that an average cup of coffee contains 100 mg caffeine, whereas a cup of tea or a 0.3 L glass of cola beverage contains about 40% of that amount.[2]

Now studies have found that more people are dependent on caffeine to the point experts are issuing a “caffeine use disorder”. Research evidence asserts that people are suffering in a greater number

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Authors Contribution

MK & NA conceptualized the project. MK did the data collection, literature search, the statistical analysis along with the drafting, revision & writing of the manuscript.

making them addicted to or compulsively using caffeine. Further, it is reflected that when people would not be able to quit by their own efforts, they usually try to have a formal treatment like outside assistance services to get rid of this excessive use of tobacco or smoking. Also, it seems realistic to state that people are taking such practices normal as being socially acceptable and having wider level of consumption because it's more of a custom in general and routine in particular consideration. Thus, most of the individuals are consuming it easily yet excessively, facing lots of adverse effects, suffering physical dependence, having troubles in daily functioning, and unable to give it up.[3]

Caffeine share several common features of alcohol and nicotine. Being pleasant for their mild psychotropic properties, they are the most widely consumed drugs worldwide. As licit psychoactive drugs, they are used mostly by "normal" people, in contrast to illicit "hard drugs," which are traditionally viewed as the province of the deviant. Known to mankind for several centuries, caffeine, alcohol, and nicotine become an important part of culture, serving as a vehicle for social interaction, shaping the urban landscape with dedicated places, stimulating the opening of International trade routes and bringing substantial tax revenues to the Governments.[4] Abnormal patterns of substance use have been described since ancient times. Today, these drugs are public health problems because of their association with physical ailments such as cirrhosis, cancer, and cardiovascular disease.

Additionally, a study presented that the number of students being involved in caffeine consumption and smoking is increasing particularly due to the growing rate of stress and conflicting demands of their lives. It is presented that nicotine and caffeine intake results in the activation of specific neurological and endocrinological pathways associated with release or inhibition of certain neuroactive materials like dopamine or hormones like cortisol et cetera. The results of the study confirmed a significant effect of stress on caffeine consumption and smoking among students.[5]

It is found in the Norwegian HUNT study and a population based study (through Mendelian randomization analyses) that a significant positive relationship exists between caffeine consumption and cigarette smoking. It further concludes that smokers experience faster removal or metabolism of caffeine through nicotine or tar resulting in double intake or increase consumption of caffeine among cigarette smokers. Further, a causal connection is elaborated in this manner. Behavioral impact of smoking on coffee consumption could be another explanation for these findings.[6]

It has been recognized that around 80% of the population of all affluent countries generally take coffee and tea on daily basis. Caffeine is appreciated because it is a stimulant; it induces alertness, elevates mood, and facilitates ideation. On subjective considerations, it improves the wellbeing of individuals, motivates them for work by reducing sluggishness, and is desirable for socialization. Caffeine consumption seems to be influenced by genetic factors, to the same degree as alcohol and nicotine. A study in 486 monozygotic and 335 dizygotic female twin pairs showed that the resemblance for total caffeine consumption, heavy caffeine use, caffeine intoxication, caffeine tolerance, and caffeine withdrawal was substantially greater in monozygotic than in dizygotic twins and the heritability of caffeine consumption was estimated at 35% to 77%.[7]

The Diagnostic and Statistical Manual of Mental Disorders (DSM-5) by American Psychiatric Association [8] presents details of caffeine use its intoxication and withdrawal. DSM-5 helps the professionals to identify patients suffering with critical effects of caffeine intake which is a serious problem being easily overlooked. Although the most severe symptoms are rare, they can hinder a person's ability to work, socialize or manage family responsibilities.

Caffeine intoxication is a condition, where due to excessive caffeine usage an individual finds it difficult to function normally, is clinically in significant distress or has impairment in accomplishing the general activities of life. This diagnosis remains largely unchanged in the new manual from its definition in the DSM-IV. Five or more symptoms out of psychomotor agitation, insomnia, muscle jerking and flushed or reddened face et cetera would be required for diagnosis. If an individual consumes 1 gram or more caffeine (around 10 cups of coffee) daily, he/she would be at risk of developing this condition. 7% of the US population meets the criteria for this disorder.[9] Again, the important point is that this condition significantly impairs daily functioning thereby threatening the survival of an individual.

Caffeine withdrawal is the second new aspect mentioned in the DSM-5 after an extensive research conducted in last few decades. It is marked by drowsiness, headaches, difficulty concentrating and flu-like symptoms (nausea, vomiting, muscle pain and stiffness). The notable trigger is the substantial reduction or a sudden termination of caffeine intake following an extensive period of excessive usage. Symptoms, which typically begin within 24 hours and peak after a day

or two, can also cause clinically significant distress or impairment.[10]

Caffeine withdrawal is usually evident when people try to permanently control caffeine consumption. It was found in a study that at least one prominent symptom (headaches, most common) is being reported by more than 70% quitters and around 24% reported additional symptoms as well. For avoiding the problematic withdrawal, people need to quit this excessive usage gradually taking months, weeks and days rather than a quick, sudden stop.

Additionally, Caffeine use disorder is also discussed in section III of DSM-V reflecting the conditions requiring further research before formally declaring it a disorder. Whereas, caffeine usage has been recognized as a well-researched domain however, more knowledge is required to consider it as a clinically significant concern. Also, an optimal research regarding the consequences of excessive caffeine consumption among children and the super-boosted influences of energy drinks needs to be documented.

There exists a tendency for some normally functioning adults to have multiple addictions. This led many authors to discuss theories of addictive personality. Researcher on addiction of common substances including chocolate, alcohol, caffeine, or cigarettes and the high risk activities like gambling, extensive exercise, intensive Internet use, television, or video gaming among college students has shown moderate to large correlations, both within and between substances and activities.[11] Studies on gender differences in addiction found men to be scoring higher than women on alcohol addiction, gambling, television and internet overuse, and smoking etc. cetera but, the score for caffeine and chocolate intake were higher for women. The issue of addiction is more complex in humans, who have the conscious capacity to evaluate, in the prefrontal cortex, whether pleasurable activities are appropriate and acted upon, or should be deferred or resisted. In our history, as exemplified by the fact that our attitude toward intoxicants and games is discussed in religious texts.

Rates of caffeine consumption and its overall level tend to increase with age until the early to mid-30s and then levels off. Age-related factors for caffeine use disorder are unknown, although concern is growing related to excessive caffeine consumption among adolescents and young adults through use of caffeinated energy drinks.

Boston Collaborative Drug Surveillance program revealed in 1972 that the prevalence of caffeine among cigarette smokers was 80.2. It was reported that 97.0% caffeine is being regularly consumed across the world.[12]

Caffeinated beverages are widely used all over the Pakistan. Caffeine consumption in Pakistan is approximately 90%. The three most common source of caffeine consumption in Pakistan includes coffee (8%, tea (19%), and black tea (90%).[13] All energy drinks, mostly soft drinks generally includes a combination of caffeine, B vitamins, and herbal ingredients. A few of them have high sugar content whereas others contain artificial sweeteners. Around 80mg of caffeine is available in the average 237 ml (8 fl. oz.) of energy drink equal to the amount in a weak cup of coffee, 480 ml (16 fl. oz.) in drinks containing around 150mg. Recently, these drinks have created a stir by containing as much as 300mg of caffeine. These drinks are typically marketed to young and busy people. Approximately 65% percent of energy drink users are under the age of 35years old, with males representing approximately 65% of the market.[14]

Major findings of one of the research in this domain suggest that people do know that energy boosters both artificial and natural are used to boost their energy level. They also agree that Caffeine have various health hazards on their body but still its consumption is common in Pakistani population. With reference to smoking, it is added that tobacco smoke inhalation reaches the airways and alveoli of lungs and influences the central nervous system within just 20 seconds of intake. Nicotine is reported to have a short distribution (8 min) and has a specified elimination period (2 hrs of half-life). This rapid delivery to brain results has intensive positive pharmacological consequences-a crucial factor in dependence on it. This in actual directed the causal connection that cigarettes smoking increases caffeine intake due to its faster consumption under the effect of nicotine.[15]

In Pakistan, the studies on the population of smokers and their caffeine intake, being most vulnerable and critical element in terms of devising comprehensive plan to cut down such curses, are very difficult to find. One of the study was conducted on healthy life styles and dietary habits of individuals in Karachi, Pakistan, where caffeine intake was considered only.[16] Next, a group of researchers conducted a study on prevalent knowledge and existing trends of caffeine consumption in Lahore, Pakistan, having the population of medical and non-medical students.[17] Further, another study is found from Karachi, Pakistan reflecting upon caffeine intake in the area.[18] Thus, only the general considerations are depicted so for.

Moreover, research evidence presented that in Pakistan, one out of every two-three individual (middle-aged) was found to be involved in cigarette smoking. One of the study revealed that 39% of Pakistani university students reported an experience of having smoked a whole cigarette whereas around 25% had 100 and more cigarettes during their lifetime.[19] Also, it was found in another study that the prevalence of smoking even in the medical students, being familiar and reasonably aware with the adverse effects of smoking on health, was around 26% in males and 1.7% in females from one of the private medical colleges of Pakistan.[20]

Further, passive smoking is also a strong concern and needs to be addressed seriously. Passive smoking was reported to be experienced by the medical students more in comparison to faculty and staff. Thus, to prevent both professionals and common people from hazardous effects of active & passive smoking and caffeine consumption, awareness and education of the masses is direly needed[13]. It is also asserted that the studies are lacking on different biochemical considerations of tobacco smoking among Pakistani population.[21]

A group of researchers [22] worked on the prevalence and determinates of cigarette smoking susceptibility among Pakistani school students. Global Youth Tobacco Survey was conducted on 8th, 9th, and 10th graders of three cities of Pakistan including Kasur, Peshawar, and Quetta with multistage sample design. The study concluded that the smoking practices of parents, friends and exposure to media advertising or marketing cigarette smoking are the prominent factors of being indulge in this curse.

A review containing the effects of caffeine consumption on human body was conducted in Karachi, Pakistan.[23] It is stated that the higher quantity caffeine intake has considerably adverse effect on different body organs including neurological, gastrointestinal, renal, respiratory, skeletal and cardiovascular systems. The regular intake of coffee, tea and other caffeinated beverages result in higher caffeine toxicity even leading to death of the consumer. Moreover, withdrawal and dependence is often reflected in the form of certain symptoms like insomnia, psychomotor agitation, anxiety, tremors, nervousness, gastrointestinal upset or stomach issues, restlessness et cetera.

This study was aimed at exploring the Caffeine Use disorder among cigarette smokers as being the most vulnerable population. Also, this population is least addressed in this relevant context of caffeine consumption from last decade as depicted in literature. Cigarette smokers' intake of caffeine is higher than nonsmokers.

Methodology

Caffeine Use disorder checklist was drawn on the basis of DSM-V criteria. A self-made dichotomous checklist having response categories of 'Yes' and 'No' was used in the study The checklist comprised of 8 items each reflecting the proposed criteria addressing the caffeine use and its impact. First four items reflected the symptoms from DSM-V, essential for diagnosing the problem, where a 'yes' response indicated the presence of the problem. Both Urdu and English versions of this checklist were used during the interview session.

The purposive convenient sampling technique was used for data collection. Sample of 30 (27 boys and 03 girls) matric, intermediate, bachelors and masters level students of different ages from 16 to 25 were interviewed. Data was collected from Islamabad and Rawalpindi. Only those participants were included in the samples who were regular cigarette smokers.

According to the criteria of World Health Organization, a smoker is a person who smoked any tobacco product on daily basis or occasionally specified at the time of survey. Further, the caffeine consumption was defined as naming the products containing caffeine along with its intake as per the criteria given under the caffeine use disorder. For this purpose the questions based DSM-V criteria were used during the semi structured interviews of the smokers incorporating caffeine use disorder checklist as well. Former smokers or non-smokers were not included in the study. Before embarking on data collection a written consent was obtained on a form and confidentially was ensured. Approval of the ethical committee (National Institute of Psychology, Quaid-i-Azam University, Islamabad) and all the essential ethical requirements were met. The participants were assured that their information will be kept confidential and will be used for the research purpose only. Participants were also told that they will be assessed about their behavior of caffeine use.

Results

Figure-1 is showing the percentage of diagnosed cases of caffeine use disorder. Results showed that 47% were suffering from caffeine use disorder and rest 53% were normal users. Out of 30 individuals 14 were found to be addicted to caffeine.

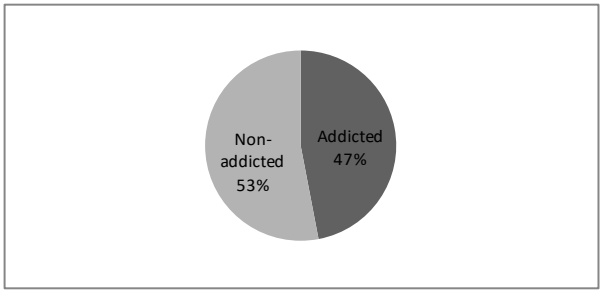

Figure 1: The prevalence of caffeine use disorder among cigarette smokers.

Item wise analysis showed that mostly all participants responded on 'Yes' suggesting being exposed to the respective condition. Most of the individuals responded 'Yes' for item no 1 and item no 3, representing their desire for caffeine use. At item no 7 there were maximum 'No' responses suggesting that they are taking caffeine in usual and controlled manner (Table-1).

Table 1: Item wise frequencies and percentages of responses computed to reflect upon the symptoms and effects of excessive caffeine intake.

Statements	*Frequencies*		*Percentages*	
	Yes	*No*	*Yes*	*No*
I use to experience persistent desire for caffeine	22	8	73	27
Despite intense efforts, I am unable to control my excessive caffeine intake.	17	13	57	43
I am unable to cut down caffeine intake despite knowing its adverse effects.	22	8	73	27
I use to experience fatigue, headache, irritability, sleepiness and difficulty focusing, when I do not find caffeine.	20	10	67	33
My daily activities got affected when I do not get caffeine.	13	17	43	57
I use to increase my caffeine intake for desired pleasure, with the passage of time.	17	13	57	43
I am taking more than intended amount of caffeine from a long period of time.	12	18	40	60
My most of the time is being spent for searching caffeine for comfort.	13	17	43	57

The participants were divided among two groups on the basis of age as the group one was comprised of individuals having age range 16-20 (late adolescent) and another group included an age range of 21-25 (early adulthood). Results showed that addiction was higher (48%) among the individual who were older (21-25 yrs) as compared to the late adolescent group (16-20 yrs), 40% of which reported being addicted to caffeine (Table-2).

Table 2: Age differences with respect to caffeine use among cigarette smokers.

Age Groups	*Group One (16-20) years*		*Group Two (21-25) years*	
	f	%	*f*	%
Addicted	2	40	12	48
Non-addicted	3	60	13	52
Total	5	100	25	100

Note. M= 0.83, SD= 0.37.

Discussion

The purpose of this study was to assess the prevalence of caffeine use disorder, identify the symptoms and effects of excessive caffeine intake and to explore the role of age among cigarette smokers. Recent studies have shown that smokers' intake of caffeine is higher than nonsmokers.[15] Coffee drinking and cigarette smoking were strongly correlated behaviors which have been suggested to act synergistically to produce adverse health consequences.[24] Caffeinated beverages were widely used all over the Pakistan. Caffeine consumption in Pakistan was approximately 90%. There were three most common source of caffeine consumption in Pakistan. It includes coffee 8%, tea 19%, and black tea 90%.[13]

Coffee consumption tends to be associated with tobacco smoking, but many studies did not account for this potential confounding in the data analysis. Moreover, adding to residual confounding by tobacco smoking, other factors may be influencing the estimates for the association between coffee and gastric cancer, since non-coffee drinkers may differ from the general population of coffee drinkers concerning other exposures such as tea, alcohol, or fruit and vegetable intake.[25]

Results of the present study showed that the prevalence of caffeine use disorder was 47%. As suggested by previous studies that caffeine use disorder was higher among cigarette smokers. Another evidence was available on serum nicotine level compared in a self-reported groups divided as smokers, non-smokers and passive smokers spanning over two-years.[15] It was concluded that the nicotine consumption was significantly higher among cigarette smokers than non-smokers and passive smokers. Further, it was added to increase the knowledge and awareness among masses regarding the careful intake of caffeine due to its adverse effect in terms of excessive intake and also

particularly associated link of it with cigarette smoking to address the complications. It was found that about 97% caffeine is being consumed regularly among cigarette smokers.[12] The present study reflected that in this smallest sample the prevalence came to be in a substantial range.

Rates of caffeine consumption and overall level of caffeine consumption tend to increase with age until the early to mid-30s and then levels off.[8] Same results emerged reflecting that the consumption of caffeine tends to increase with age. As reflected in results that 40% were addicts having age range of 16-20 and compared to them 48% of the members of group two (age range was 20-25) were addicted.

Previous findings of meta-analysis of 21 studies on coffee consumption and lungs cancer with an independent consideration of tobacco intake concluded a strong association between coffee consumption and lung cancer (could be confounded by tobacco smoking). Also, among non-smokers coffee intake was not found to be associated with the risk of lung cancer.[26]

The complexity of coffee composition and the multiple social contexts underlying consumption make the evaluation of the effect of coffee on gastric cancer very difficult. Human experimental studies on such associations were unlikely, making observational studies the best available source of evidence on risk.[27] Knowledge on the level of exposure to different coffee constituents may provide a deeper understanding of the real role of coffee on cancer risk among cigarette smokers and ultimately allow the design of safer beverages.

The limitations of the study included a purposive convenient sampling and a comparatively small sample size, which would make it difficult to generalize the findings however it has set a clear directions for upcoming explorations. Hence after establishing the prevalence of caffeine use among cigarette smokers more studies on larger sample may be conducting to investigate and address the health threatening impacts of caffeine use among cigarette smokers.

Present exploration has strong potential for practitioners, physicians and psychologists particularly to assist the smokers and to devise the treatment plan accordingly. Another need is to have causal clarity with mediating and moderating explorations for understanding mechanisms of being deadly involved in such compulsions. Also, this would have prospective consideration for smokers themselves to reflect upon their tendencies threatening and worsening the conditions gradually for them. This study also has a way for media to help masses in terms of awareness and knowledge regarding the complexity of caffeine consumption and cigarette smoking either active or passive. Also, new research in this domain would get reasonably optimal content from this study to move on.

Conflict of interest: None declared.

References

1. Calamaro CJ, Mason TB, Ratcliffe SJ. Adolescents living the 24/7 lifestyle: effects of caffeine and technology on sleep duration and daytime functioning. Pediatrics 2009; 123(6): e1005-10.
2. Mitchell DC, Knight CA, Hockenberry J, Teplansky R, Hartman TJ. Beverage caffeine intakes in the US. Food Chem Toxicol 2014; 63: 136-42.
3. Juliano LM, Evatt DP, Richards BD, Griffiths RR. Characterization of individuals seeking treatment for caffeine dependence. Psychol Addict Behav 2012; 26(4): 948-54.
4. Crocq MA. Alcohol, nicotine, caffeine, and mental disorders. Dialogues in clinical neuroscience, 2003; 5(2): 175.
5. Šabić L, Mujanović A. Smoking and Caffeine Consumption as Stress Coping Mechanisms in Medical Students. International Conference on Medical and Biological Engineering. CMBEBIH 2019: 681-6.
6. Bjørngaard JH, Nordestgaard AT, Taylor AE, Treur JL, Gabrielsen ME, Munafò MR, et al. Heavier smoking increases coffee consumption: findings from a Mendelian randomization analysis. IntJ Epidemiol 2017; 46(6): 1958-67.
7. Kendler KS, Myers J, Prescott CA. Specificity of genetic and environmental risk factors for symptoms of cannabis, cocaine, alcohol, caffeine, and nicotine dependence. Arch Gen Psychiatry 2007; 64(11): 1313-20.
8. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (DSM-5®). American Psychiatric Pub; 2013. (Accessed on 7th June 2019) Available from URL:https://www.psychiatry.org/psychiatrists/practice/dsm
9. O'Brien MC, McCoy TP, Egan KL, Goldin S, Rhodes SD, Wolfson M. Caffeinated alcohol, sensation seeking, and injury risk. J Caffeine Res 2013; 3(2): 59-66.
10. O'Brien MC, McCoy TP, Rhodes SD, Wagoner A, Wolfson M. Caffeinated cocktails: energy drink consumption, high-risk drinking, and alcohol-related consequences among college students. Acad Emerg Med 2008; 15(5): 453-60.
11. Ata-ur-Rahman M. Estimation of serum nicotine by gas chromatography in smokers, passive smokers and never smokers. JPMA 2012; 62(8): 790-3.
12. Greenberg JL, Lewis SE, Dodd DK. Overlapping addictions and self-esteem among college men and women. Addict Behav 1999; 24(4): 565-71.
13. Swanson JA, Lee JW, Hopp JW. Caffeine and nicotine: a review of their joint use and possible interactive effects in tobacco withdrawal. Addict Behav 1994; 19(3): 229-56.

14. Gallup Pakistan. Gallup Pakistan Poll Findings on Tea and Coffee Intake. (Accessed on 7th June 2019) Available from URL:http://gallup.com.pk/bb_old_site/Polls/1-04-09, 2009.
15. Tahir A, Dilshad A. Awareness of energy drinks' effects. (Accessed on 7th June 2019) Available from URL:http://www.scribd.com/doc/16648974/Energy-drinks-in-pakistan, 2014.
16. Sajwani RA, Shoukat S, Raza R, Shiekh MM, Rashid Q, Siddique MS, Kadir MM. Knowledge and practice of healthy lifestyle and dietary habits in medical and non-medical students of Karachi, Pakistan. J Pak Med Assoc 2009; 59(9): 650-5.
17. Ahmad ME, Hinna R, Tayyab A. Knowledge and trends of caffeine consumption among medical and non-medical students of Lahore Pakistan. Pak J Neurol Sci 2017; 12(2): 24-30.
18. Carmody TP, Brischetto CS, Matarazzo JD, O'Donnell RP, Connor WE. Co-occurrent use of cigarettes, alcohol, and coffee in healthy, community-living men and women. Health Psychol 1985; 4(4): 323-35.
19. Ahmad K, Jafary F, Jehan I, Hatcher J, Khan AQ, Chaturvedi N, et al. Prevalence and predictors of smoking in Pakistan: results of the National Health Survey of Pakistan. Eur J Cardiovasc Prev Rehabil 2005; 12: 203-8.
20. Omair A, Kazmi T, Alam S. Smoking prevalence and awareness about tobacco related diseases among medical students of Ziauddin Medical University. J Pak Med Assoc 2002; 52: 389-92.
21. Aslam SK, Zaheer S, Rao S, Shafique K. Prevalence and determinants of susceptibility to cigarette smoking among school students in Pakistan: secondary analysis of Global Youth Tobacco Survey. Subst Abuse Treat Prev Policy 2014; 9(1): 10.
22. Kazi SH. Effect of caffeine on the human body: A review. Baqai. J Health Sci 2015; 18(1): 25-30.
23. Ashraf Z, Waheed N, Iftikhar G. Caffeine: a cross-sectional analysis of caffeine intake in Karachi, Pakistan. FUUAST J Biol 2018; 8(2): 359-62.
24. Brown CR, Benowitz NL. Caffeine and cigarette smoking: behavioral, cardiovascular, and metabolic interactions. Pharmacol Biochem Behav 1989; 34(3): 565-70.
25. Galarraga V, Boffetta P. Coffee drinking and risk of lung cancer-a meta-analysis. Cancer Epidemiol Biomarkers Preven 2016; 25(6): 951-7.
26. Botelho F, Lunet N, Barros H. Coffee and gastric cancer: systematic review and meta-analysis. Cadernos De Saude Publica 2006; 22: 889-900.
27. Klesges RC, Ray JW, Klesges LM. Caffeinated coffee and tea intake and its relationship to cigarette smoking: an analysis of the Second National Health and Nutrition Examination Survey (NHANES II). J Subst Abuse 1994; 6(4): 407-18.