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Original Research Article

Caffeine intake among Northern Border Area Population in Saudi Arabia

Sultana Alshammary*, PharmD, Amna Mohamed, PhD

Ministry of Health, Oncology Department, Prince Abdulaziz Bin Musaad Hospital

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***Corresponding author:** Sultana Alshammary

Abstract

Background: Caffeine is an alkaloid occurring naturally in plants. It is a widely consumed food/drug constituent and has well-documented benefits like improvement in mental alertness, concentration, fatigue and athletic performance. The primary objective of this study explores the behavior and attitude of Saudi people in Northern Border Area regarding caffeine intake. The secondary objectives of the study are to determine the mostly used caffeinated products, the frequency of caffeine use and the study group background about drug interaction with caffeine. ***Methods:*** Descriptive cross-sectional design was used to carry out this study from December 2015 to March 2016. The study was conducted in different areas in Northern Border region. The sample comprised of 454 Saudi persons aged between 15 and 60 years. Data was collected through a structured paper questionnaire, mentioning the purpose of the study after taking oral consent. Statistical analysis was done by utilizing MS EXCEL program functions. ***Results:*** The males represented more than half (57%) of the study group. Participants with university education represented 48.5% and secondary education represented 42% of study population. Only 11% of this study participants informed about having chronic diseases. Coffee is the most preferred drink containing caffeine (51%), followed by carbonated soft drink (22.5%). 26% began consumption at age group of 8 to 16 years and 28% began at age group of 16 to 18 years. 39% of participants have no certain cause for caffeine consumption. 31% of study group drink one cup/bottle per day, while 25% of study group drink two cups/bottles per day. 28% participants experience some symptoms when quitting or delaying caffeine drink mainly headaches (18.1%). 56% participants use more than one type of caffeine. The cost is not a significant factor in caffeine product choice (77%). 69% of participants reported that their friends have no effect on the choice for caffeine type. More than half of the participant group (58%) haven't information about drug interaction with caffeine. the internet is the main source of information for 33% of participants reported to have information. 77% subjects of study believe that too much caffeine badly affects health. 43% of this study group believe that benefits of caffeine outweigh its harmful effect. ***Conclusion:*** Females consume and prefer coffee and tea for caffeine while males prefer caffeinated energy drinks and carbonated soft drinks. There was no certain cause found for caffeine consumption. Awareness about drug interaction with caffeine and caffeine risk on health was moderate. The internet represents the main source of information.

Keywords: Caffeine, fatigue, chronic diseases, caffeine.

INTRODUCTION

Caffeine is an alkaloid occurring naturally in plant species like coffee beans, tea leaves, cocoa beans, cola nuts and others. It is one of the most frequently ingested pharmacologically active substance in the world, found in common beverages (coffee, tea, soft drinks, energy drinks) [1].

Caffeine is a widely consumed food/drug constituent. The major sources, the demographics of consumers, quantity consumed and withdrawal effects of caffeine have long been of interest. The majority of the caffeine consumed comes from beverages but also includes chocolate and other cocoa-containing foods [2, 3]. Caffeine intake differs across various types of beverages and population groups [2, 4, 5].

The amount of caffeine consumed in beverages varies enormously and is dependent on the strength of the drink and the amount consumed with each serving playing a key role. *Coffea canephora* (robusta) is known to contain more caffeine than *Coffea Arabica* (arabica). As a basic guideline, an average sized cup of soluble coffee contains approximately 65 mg caffeine, whilst a cup of roast and ground coffee contains around 85 mg. A 30 ml espresso cup contains around 50-60 mg caffeine. A can of cola or a cup of tea contains 25-45 mg caffeine. Tea contains more caffeine than coffee on a dry weight basis, but a

smaller serving of tea is used to prepare a brew. Decaffeinated coffee generally provides less than 3 mg caffeine per cup. Cocoa and chocolate products contain a tiny amount of caffeine [6].

Arabic coffee or (Gahwa) is a primary caffeine source which is significant in the Kingdom of Saudi Arabia as well as in our Gulf countries. Serving Gahwa in Saudi Arabia is a local custom and sign of hospitality and generosity. The demand for Arabic coffee is considered a traditional part of daily life in the Kingdom.

Energy drinks and shots are sources of caffeine but to a lesser extent than coffee. Some segmented studies show that such drinks may be more commonly consumed by young adults, teenagers, college students, athletes and military personnel [7]. Energy drinks as a source of caffeine are highly consumed in Saudi Arabia especially by adolescents [8].

Carbonated soft drinks (CSDs), tea and some fruit-flavored and water beverages also contribute to total caffeine intake among the population. CSDs have been shown as the primary source of caffeine among children compared to coffee as a major source in adults [2, 4]. Caffeine is a food constituent that can exert physiological effects. Scientific and historical evidence shows that among the healthy adult population, moderate caffeine consumption (400 mg/day) is not associated with adverse effects on health. Improvements in mental alertness, concentration, fatigue and athletic performance are well-documented benefits [7]. Caffeine and/or coffee consumption has also been associated with weight loss, improved glucose tolerance and lower risk of type II diabetes; reduced risk for incidence of Parkinson's disease and improvement in Parkinson's symptoms; and reduced risk of cancer at several sites [8]. Caffeine has been reported as a protective substance for cellular damage with beneficial antioxidant effects [9, 10].

Epidemiologic studies have largely supported caffeine/coffee as a protective measure against cognitive impairment and Alzheimer's disease (AD). A previous prospective study reported significantly less cognitive decline over a 4–10 year period in aged men drinking three cups of coffee daily [11]. Another study reported less cognitive decline in aged women whose daily caffeine intake was equal to more than three cups of coffee [12]. Two epidemiologic studies evaluated mid-life coffee intake and risk of later AD, with one study reporting a 65% decreased risk of AD in individuals who drank 3–5 cups of coffee daily during their 40s and 50s [13]. Coffee as the main source of caffeine is also rich in many other components (antioxidants, anti-inflammatory compounds) that may also complement caffeine's actions to reduce the risk of AD [14, 15].

The dependence on caffeine has been studied over the past few years and caffeine has even been postulated as a 'potential model of drug of abuse' [16]. Caffeine withdrawal translates to typical symptoms like headaches, feelings of weariness, weakness and drowsiness, impaired concentration, fatigue and work difficulty, depression, anxiety, irritability, increased muscle tension, occasionally tremor, and nausea and vomiting, as well as withdrawal feelings. Withdrawal symptoms generally begin about 12–24 hours after sudden cessation of caffeine consumption and reach a peak after 20-48 hours. However, in some individuals, these symptoms can appear within only 3–6 hours and then last for one week. Withdrawal symptoms do not relate to the quantity of caffeine ingested daily [16].

In humans, the tolerance to some physiological actions of caffeine has been shown to occur. This is the case for the effect of caffeine on blood pressure and heart rate, diuresis, plasma adrenaline and noradrenaline levels, and renin activity that usually develops within a few days. Tolerance to some subjective effects of caffeine, such as increases in tension-anxiety, jitteriness/ nervousness, activity/stimulation/energy, and the strength of drug effect was recently shown to occur as well. Conversely, although tolerance to the enhancement of arithmetic skills by caffeine was recently shown, there is only limited evidence for tolerance to caffeine-induced alertness and wakefulness. These effects are paralleled by the lack of tolerance of cerebral energy metabolism to caffeine, since an acute administration of 10 mg/kg caffeine induces the same metabolic increases whether the rats have been exposed to a previous daily chronic treatment by caffeine or saline for 15 days. It shows that every single exposure to caffeine can produce cerebral stimulant effects. It is especially true in the areas that control locomotor activity (caudate nucleus) and the structures involved in the sleep-wake cycle (locus coeruleus, raphe nuclei and reticular formation) [16].

Death due to excessive caffeine ingestion is not common, and only a few cases have been reported in the literature. The acute lethal dose in adult humans has been estimated at 10g/person. Death has been reported after ingestion of 6.5g caffeine, but survival of a patient who allegedly ingested 24g caffeine is also on the record [1].

Up to 400 milligrams (mg) of caffeine a day appears to be safe for most healthy adults. That's roughly the amount of caffeine in four cups of brewed coffee, 10 cans of cola or two "energy shot" drinks. Although caffeine use may be safe for adults, it's not a good idea for children. And adolescents should limit themselves to no more than 100 mg of caffeine a day. Even among adults, heavy caffeine use can cause unpleasant side effects [17].

OBJECTIVE OF THE STUDY

The primary objective of this study aimed to explore behaviors and attitudes of Northern Border Area Saudi people about caffeine intake. The secondary objectives of the study are to determine the mostly used caffeinated products, the frequency of caffeine use and the study group background about drug interaction with caffeine.

MATERIALS AND METHODS

Research Design and Setting

Descriptive cross-sectional design was used to carry out this study for a period of four months from December 2015 to March 2016. The study was conducted in different areas in Northern Border Region (Arar and Rafha), which includes Northern Border University, secondary schools and shopping malls.

Sampling and Subjects

People who accepted to participate and answer the questionnaire were 469. After exclusion of 16 incompletely answered questionnaire, the totally included sample population who met all inclusion criteria were 453.

A random sample comprised of 453 Saudi persons aged between 15 years and 60 years was used. The inclusion criteria had the parameters: i) Saudi population, ii) age between 15 and 60 years, and iii) living in Northern Border Area. The exclusion criteria was: i) persons who are not willing to participate in the study, ii) those with age less than 15 or older than 60, and iii) incompletely answered questionnaire.

Data Collection Tool

A structured questionnaire was designed for data collection by the researcher, developed in Arabic language and includes four parts. The first part included demographic data like gender and graduation level. The second part recorded the history of diseases among participant population (chronic diseases and medication which the participant take). The third part found data concerning caffeine consumption behavior and attitude (the participants were asked to mention the preferred type of caffeine containing beverage, age at which they started caffeine consumption, cause of caffeine consumption, daily consumption of caffeine, symptoms which occur when delaying caffeine intake, drinking the same type of caffeine, price as a factor for caffeine selection, effect of friends on selection of caffeine beverage). The last part of the questionnaire asked about the perception and belief about caffeine (knowledge about interaction between caffeine and drugs, effect of consumption of large amount caffeine on health, benefits of caffeine comparable to is harmful effects).

Data was collected through structured paper questionnaire. Once the participants who met the inclusion criteria were identified, the purpose of the study was explained to all of them, and they were informed that their participation in the study is voluntary and their information and responses to questionnaire will remain confidential. Then the questionnaires were distributed to those who agreed to participate. It took the participants 15-20 minutes to complete the questionnaire.

STATISTICAL ANALYSIS

After all questionnaires being filled by participants, all data had been coded and entered into computer for analysis by utilizing MS EXCEL program. Descriptive statistical analysis was used to determine the frequency for each variable. Also, statistical analysis determined the relation between different variables like gender and the preferred caffeinated drink, education and distribution and preferred caffeinated drink, gender and starting age for caffeine consumption, educational level and background knowledge about caffeine.

Ethical Considerations

Saudi participants were informed about the nature of the study. Oral consent was obtained from the study group. All participants were informed that their participation is voluntary. They were also informed that the data collected will remain confidential.

RESULTS

The results are presented here according to the themes that are described in the research methodology. They include presentation of results of demographic information, history of diseases, caffeine consumption, and background information and belief concerning caffeine.

Demographic Information

Among the participants, the males represented more than half (57%) of the study population, with females represented less than half (43%). The distribution of demographic characteristics of study participants are shown in Table 1. Educational level for the study participants was university education for 48.5% of participants and post graduate degree for 4% of participants, so the university and post graduate degree education represent approximately half of the study group (52.5%). Secondary education represented 42% of study population. Preparatory and primary education represented 1% and 3.5% respectively of the study group, while only 1% of the study group were uneducated (Figure-1).

Table-1: Demographics of Study Participants (n=453)

Variable		Frequency	Percentage
Gender	Male	258	0.57
	Female	195	0.43
Educational Level	Post graduate degree	17	0.04
	University education	220	0.485
	Secondary education	189	0.42
	Preparatory education	6	0.01
	Primary education	16	0.035
	Uneducated	5	0.01

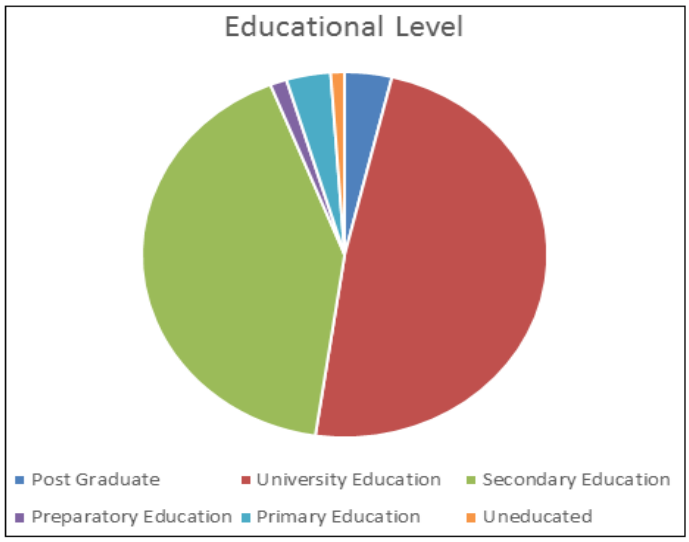

Fig-1: Educational Level of Study Participants

History of Diseases

The majority of study population (89%) doesn't have any chronic disease (Table 2), and only 11% of this study participants reported that they have chronic diseases.

Table-2: Chronic Disease Presence in Study Participants

Question	Answer			
Do you have any chronic disease?	Yes		No	
	Frequency	Percentage	Frequency	Percentage
	48	11%	405	89%

When the participant group was asked if they are affected by hypertension, diabetes, or asthma, the answers were as follows (Table-3): 59% of the study participants do not have any disease. Study group affected by hypertension accounted only 3%, while diabetes also was present in 3% of the study group. Those affected by asthma represented 9%, but there were 26% participants who did not answer this question. The pie chart represents the frequency of participants vividly (Figure-2).

Table-3: Diseases in Study Participants

Question	Answer					
Do you have any of the following diseases?		Hypertension	Diabetes	Asthma	Others	
	Frequency	12	13	40	Not have any disease	Not answered
					270	118
	Percentage	3%	3%	9%	59%	26%

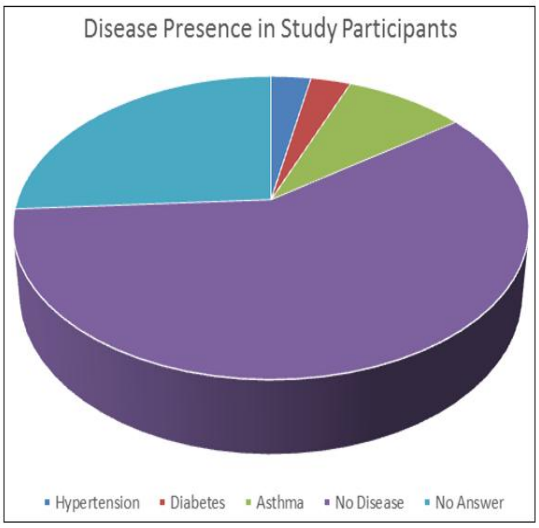

Fig-2: Disease Breakdown among Study Participants

When the participants were asked about the medications they take (Table-4), the answers for questionnaire demonstrated that 2.4% of them take antihypertensive medications, 2.6% take medications for diabetes, and 5.2% take medications for asthma. Also, the study group mentioned other diseases for which they take medication, specifically kidney disease, hemophilia, cancer, and hyperlipidemia. Each one of them represented 1% of all the study participants. The pie chart provides a comparison of these diseases for which participants use medication (Figure-3).

Table-4: Disease Medication among Study Participants

Question	Answer		Frequency	Percentage
Do you take medication for any of the following disease?	Hypertension		11	2.40%
	Diabetes		12	2.60%
	Asthma		24	5.20%
	Others	Kidney disease	1	0.20%
		Cancer	1	0.20%
		Hemophilia	1	0.20%
		Hyperlipidemia	1	0.20%

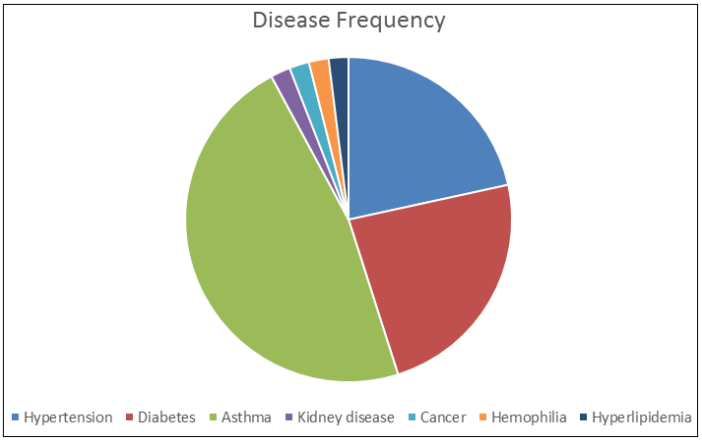

Fig-3: Distribution of Diseases among Study Participants

Caffeine Consumption Behavior and Attitude

Regarding the preferred beverage (Table-5) that contains caffeine out of the 454 participants, 232(51%) prefer coffee, 66(14.5%) prefer tea, 53(12%) prefer caffeinated energy drinks like Red Bull and Bison, and 102(22.5%) prefer carbonated soft drinks like Pepsi and Coca Cola. The study finds coffee as the most preferred drink for caffeine intake, followed by carbonated soft drink. The figure shows precisely the distribution of different caffeine providing beverages (Figure-4).

Table-5: Preferred Caffeine Containing Beverage of Study Participants

Question	Answer				
Which is the preferred beverage containing caffeine do you like?		Coffee	Tea	Caffeinated Energy Drinks	Carbonated Soft Drinks
	Frequency	232	66	53	102
	Percentage	51%	14.50%	12%	22.50%

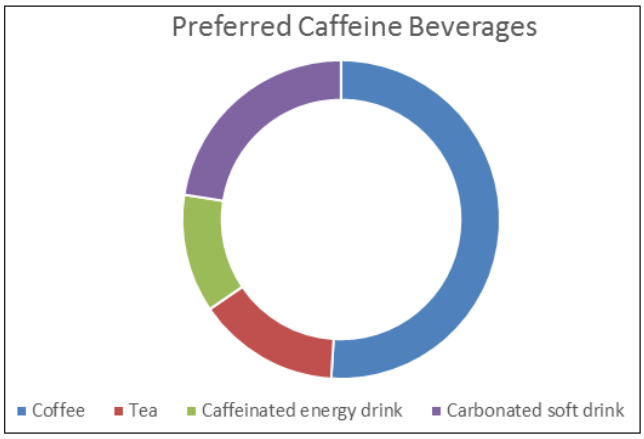

Fig-4: Percentage of Preferred Caffeine Beverages

Coffee is predominantly used by females while males prefer a more even spread of different beverages (Figure-5).

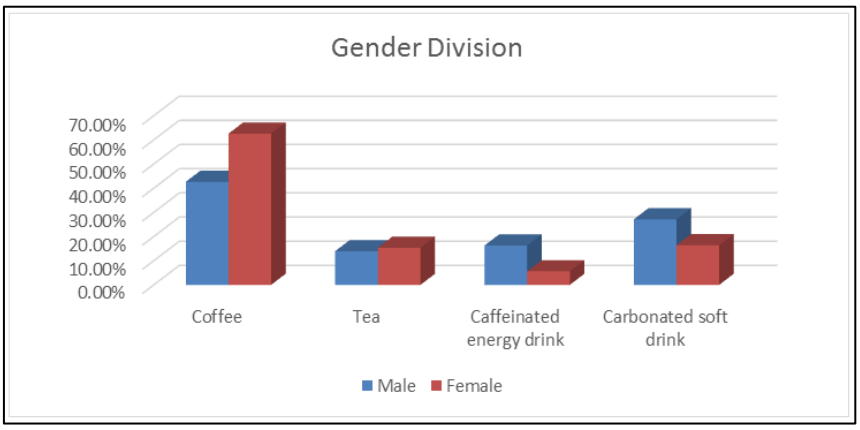

Fig-5: Gender-based Preference of Caffeine Drink Use by Study Participants

Another interesting find is to look at caffeine beverage consumption related to the educational level of the study participants. Data shows that university educated people prefer coffee and tea while those with lower education are more interested in energy and soft drinks containing caffeine.

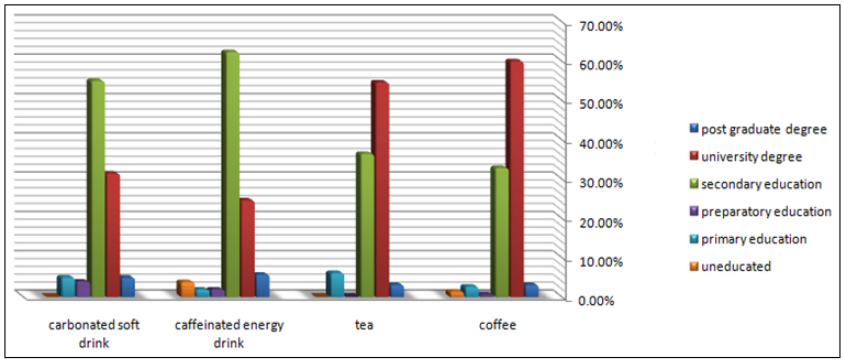

Fig-6: Preferred Caffeinated Drink and Educational Level of Study Participants

For the question about the age range for beginning caffeine consumption (Table-6), 8% began consumption at age 8 years or younger, 26% began consumption at age ranged from 8 to 16 years, 28% began at age ranged from 16 to 18 years, 18% began at age range of 18 to 20 years, and 20% began their consumption at age range of 20 years or older.

Table-6: Caffeine Consumption Starting Age Ranges for Study Participants

Question	Answer					
Which was your age range when you started caffeine consumption?		8 years old or younger	8-16 years	16-18 years	18-20 years	20 years or older
	Frequency	36	117	126	81	93
	Percentage	8%	26%	28%	18%	20%

The figures represent the division of age in terms of starting coffee as well as how this starting age contrasts with the gender of the study participants (Figures-7). The study found that on average, males start caffeine consumption earlier (Figure-8).

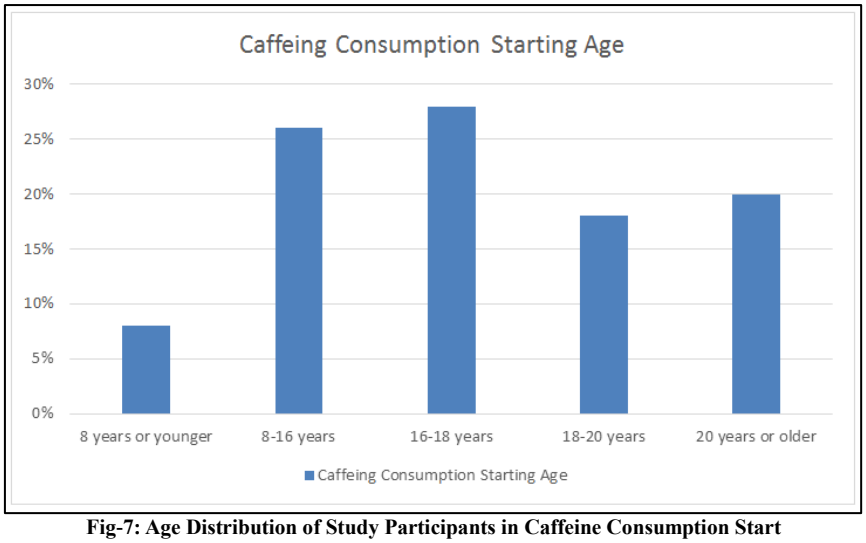

Fig-7: Age Distribution of Study Participants in Caffeine Consumption Start

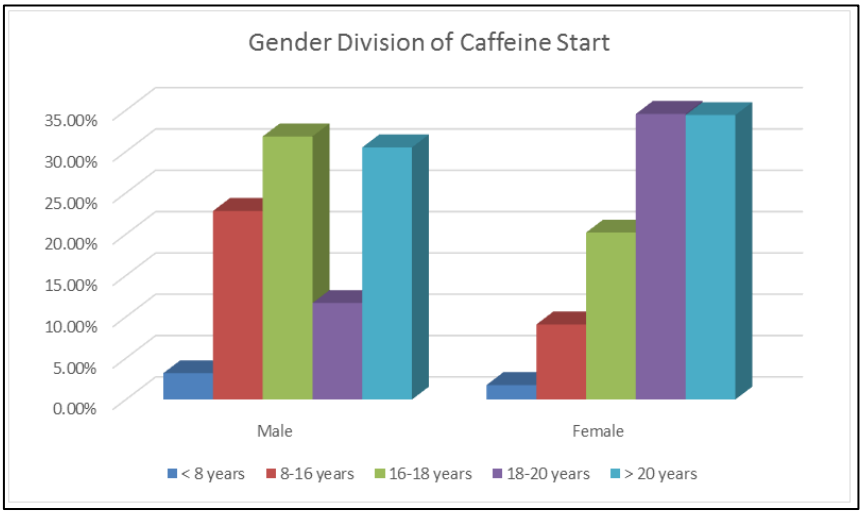

Fig-8: Gender Breakdown of Caffeine Consumption Starting Age

39% of participants have no certain cause for caffeine consumption, 28% drink coffee to be alert and stay awake at night, 19% drink coffee to increase their concentration, while 14% drink coffee for increasing their physical activity during the day, which indicates that the largest percentage of participants prefer to drink coffee without cause (Table-7). A diagrammatic presentation shows it better (Figure-9).

Table-7: Causes of Caffeine Consumption in Study Participants

Causes of Caffeine Consumption	Frequency	Percentage
To be alert and stay awake late at night	125	28%
Increase and physical activity during the day	65	14%
Help for increase concentration	87	19%
There's no certain cause	176	39%

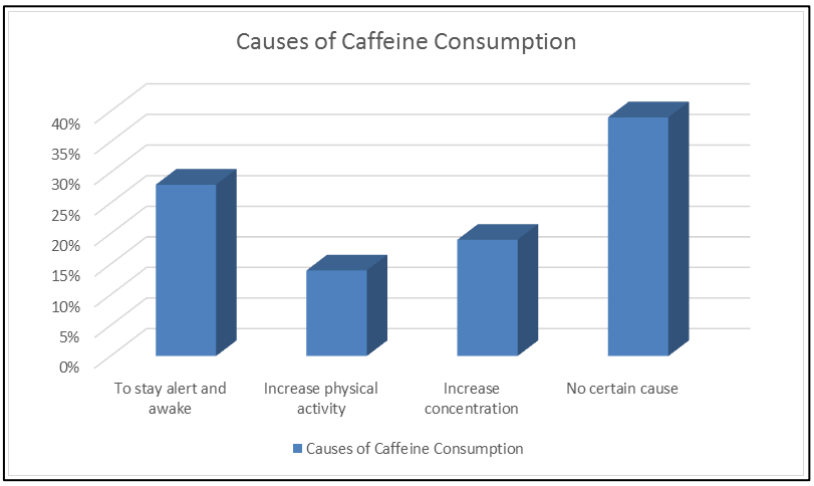

Fig-9: Causes of Caffeine Consumption

31% of the study group drink one cup/bottle per day, 25% of study group drink two cups/bottles per day, 21% consume more than four cups/bottles, 16% consume three cups/bottles daily, and 7% drink four cups/bottles. It demonstrates that the major group among the participants drink one cup/bottle daily (Table-8). The pie chart shows the percentage division of consumption (Figure-10).

Table-8: Daily Caffeine Consumption of Study Participants

Daily Consumption of Caffeine	Frequency	Percentage
One cup/bottle	142	31%
Two cups/bottles	115	25%
Three cups/bottles	70	16%
Four cups/bottles	31	7%
More than four cups/bottles	95	21%

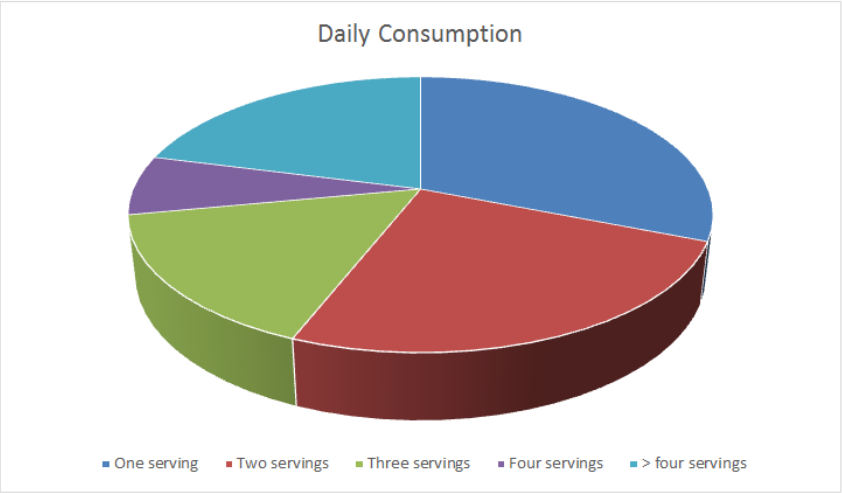

Fig-10: Spread of Daily Caffeine Consumption by Percentage

72% of participants don't experience any symptoms when not drinking caffeine at the usual time, but 28% experience some symptoms when quitting or delaying caffeine intake. When the participants who replied that they face symptoms when delaying caffeine drink were asked to mention the symptoms that they

feel experience, 18.1% reported to have headache, 5.9% reported that they feel lassitude, 2.4% feel drowsiness, 1.1% reported feeling dizziness, 0.2% felt jerking, and 0.2% felt tachycardia (Table 9). The majority of participants however recorded that they do not face any symptom from caffeine intake delays (Figure-11).

Table-9: Symptoms Faced when Delaying Caffeine Intake

Question		Frequency	Percentage
Do you experience any symptoms when quitting caffeine or not drinking it in the usual time?	Yes	127	28%
	No	326	72%
Symptoms Experienced	Headache	82	18.10%
	Dizziness	5	1.10%
	Lassitude	27	5.90%
	Drowsiness	11	2.40%
	Jerking	1	0.20%
	Tachycardia	1	0.20%

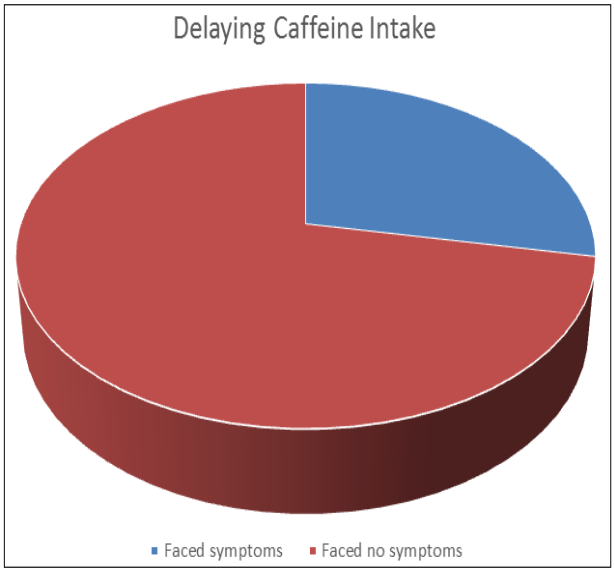

Fig-11: Participants Facing Symptoms or not when Delaying Caffeine Intake

The last part of the questionnaire contained three questions to be answered by choosing ‘‘yes’’ or ‘‘no’’ concerning the use of caffeine products. 44% participants always drink the same type of caffeine while 56% drink more than one type of caffeine. The cost is not an important factor in caffeine product choice for 77% of the participants. However, it is significant for the remaining participants, which are still close to one-fourth of the research population. 69% of the participants reported that their friends have no effect on their choice of caffeine, but 31% subjects reported that friends have a role in this aspect (Table-10).

Table-10: Type of Caffeine and Influence of Cost and Friends on Study Participants

Questions	Answers			
	Yes		No	
	Frequency	Percentage	Frequency	Percentage
You always drink the same type of caffeine	198	44%	255	56%
The cost is always an important factor in caffeine type selection	105	23%	348	77%
Your friends have an effect on your choice for caffeine	142	31%	311	69%

Background and Belief Concerning Caffeine

More than half of the participants (58%) do not have knowledge concerning drug interactions with caffeine. The remaining 42% of participants answered that they have information about drug interactions with caffeine (Figure-12).

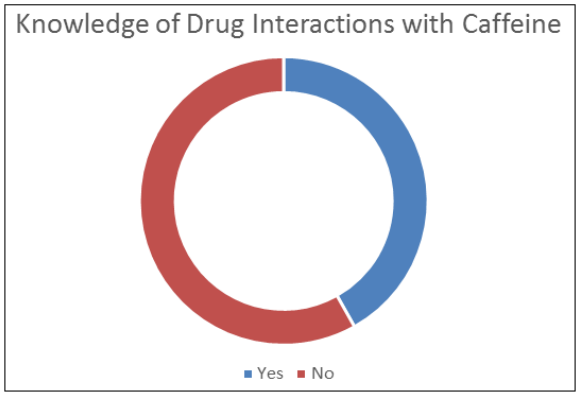

Fig-12: Information Concerning Drug Interaction with Caffeine

When the results of drug interaction knowledge is compared with education level of participants, the study found that the highest percentage of people not aware of interaction had only secondary education. The largest educational group with this knowledge was people with university education (Figure-13).

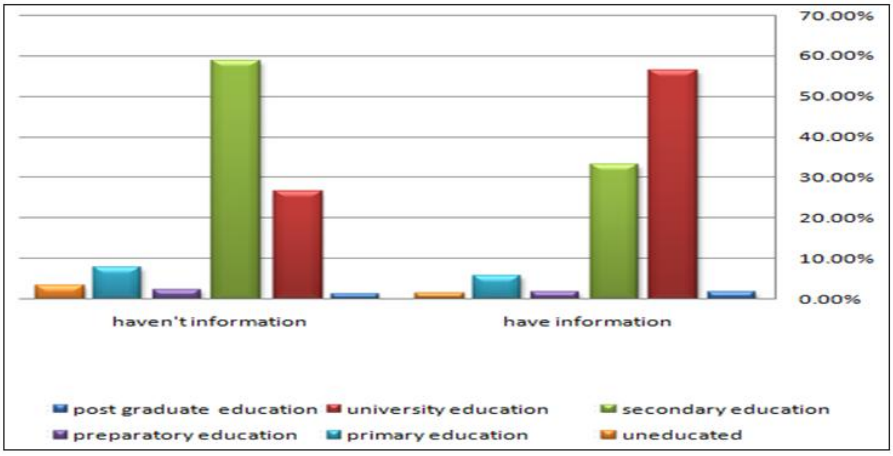

Fig-13: Comparing Drug Interaction Knowledge with Educational Level of Study Participants

Regarding the source from which the participant acquired their information about the drug interaction with caffeine, the internet is the main source for 33% of participants, physicians are the source of information for 13% of study group, and pharmacists represent the source of information for only 12% of study subjects (Table-11).

Table-11: Source of Information about Drug Interaction with Caffeine

Question	**Answer**				
		Physician	Pharmacist	Internet	Other
Your source of information about drug interaction with caffeine	Frequency	61	53	150	190
	Percentage	13%	12%	33%	42%

77% of study population believed that too much caffeine affects health badly. The opinion of 23% of study population was that drinking caffeine by large amounts does not affect health. 43% of the study group replied in affirmative for the question stating, "Benefits of caffeine outweigh the harmful effect" (Table-12).

Table-12: Benefits and Harmful Effects of Using Caffeine

Question	**Answer**			
	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Consumption of too much caffeine has bad effect on health	348	77%	105	23%
Benefits of caffeine outweigh the harmful effect	193	43%	260	57%

DISCUSSION

The objective of this research was to study caffeine intake practices among Saudi population in Northern Border Area of Saudi Arabia. Males represents a larger percentage than females. Participants with university education represent the highest number in study group followed by secondary education. Only 48 participants have chronic diseases, while 12 of them have hypertension as the most prevalent chronic disease. A previous systematic review concluded that in hypertensive individuals, caffeine intake produces an acute increase in blood pressure (BP) for more than three hours. However, current evidence does not support an association between longer-term coffee consumption and increased BP or between habitual coffee consumption and an increased risk of cardiovascular disease (CVD) in hypertensive subjects [18]. Evidences from previous randomized controlled trial (RCT) of coffee and BP concluded that short-term (<12 weeks) intake of caffeinated coffee, both filtered and instant, causes BP elevations of around 2/1 mmHg when compared to abstinence or use of decaffeinated coffee [19]. Also, previous critical review on databases concluded that regular coffee may be harmful to some hypertension-prone subjects. The possible mechanisms of the cardiovascular effects of caffeine include the blocking of adenosine receptors and the inhibition of phosphodiesterases [20]. In contrast, in a large study of habitual caffeine intake and risk of hypertension, the research group analyzed data from a large prospective cohort study in 155,594 US nurses [21]. Intake of caffeinated coffee was weakly related to incident hypertension inversely, with around 10% reduction in risk in women who drank four or more cups, compared to women drinking three or less cups per day. Contrary to coffee, a high intake of cola significantly increased the risk of hypertension in the women among the study participants as there were 13 diabetic participants. A previous study indicates that both caffeinated and decaffeinated coffee consumption increase levels of amino acid homocysteine within hours of coffee consumption [22, 23]. For people with diabetic people, raised levels of homocysteine increase the risk of developing degeneration of the blood vessels in the eyes. But regular coffee drinking has been reported to reduce the risk of diabetes mellitus [24]. Caffeine has a beneficial effect on asthma patients. A systematic review in 2011 on six randomized trials (RCTs) of oral caffeine demonstrated that caffeine appears to improve airways function modestly in asthmatic patients [25].

In this current study, the males primarily reported beginning drinking caffeine at age range of 16-18 years, while female began consuming at age 18 or above. In this current study, coffee and tea are preferred by females over males (62.56% versus 42.64% for coffee and 15.38% versus 13.95% for tea), while caffeinated energy drink and carbonated soft drink are preferred more by males than females (27.13% versus 16.41% for caffeinated energy drink and 16.28% versus 5.64% carbonated soft drink). This result about coffee consumption is in contrast to a previous study on 1528 young people as the result indicated that coffee consumption rate was significantly higher in males (50.8%) than in females (32.8%) [26]. However, the results regarding the energy drinks are consistent with previous study results which indicated that Energy drinks, in particular, were consumed more often by males compared to females among university students [27].

In the previous studies, rates of energy drink consumption estimated among school students tend to be higher (65.3%) than university students (29.3%) [28]. The average age at first consumption is roughly 15 or 16 years as indicated in previous studies [29, 30]. The result of current study indicates that people with secondary education consume more caffeinated energy products as a main source of caffeine than with other educational levels.

Also, the results in this current study demonstrated that university education participants consume coffee over other caffeine containing beverages, which is consistent with a previous study on university students, which may be due to the nature of academic education that often necessitates students to study for extended periods of time; especially at times of increased workloads such, as prior to tests or examinations [31].

The caffeine withdrawal syndrome has been well-characterized in numerous rigorous double-blind studies. The potential for caffeine withdrawal to cause clinically significant distress or impairment in functioning is reflected by the inclusion of caffeine withdrawal as an official diagnosis in International Statistical Classification of Diseases and Related Health Problems (ICD-10 by World Health Organization) and as a proposed diagnosis in Diagnostic and Statistical Manual of Mental Disorders (DSM-IV by American Psychiatric Association). Although most research on withdrawal has been performed with adults, there is also evidence that children experience withdrawal effects during caffeine abstinence. The most commonly reported withdrawal symptoms are headache, fatigue, sleepiness/drowsiness, difficulty concentrating, work difficulty, irritability, depression, flu-like symptoms and impairment in psychomotor, vigilance, and cognitive performances [32]. The study group reported that headache, dizziness, lassitude, drowsiness, jerking, and tachycardia are the symptoms that occur when delaying caffeine ingestion. More than half (58%) of the participants don't have any information about drug interaction with caffeine, and majority of those who reported to have information had university education but mention the internet as the main source of their

knowledge. It warrants an increase the knowledge among caffeine consumers about the interaction which may occur from caffeine with certain drugs, especially by pharmacists who are experts in drug efficacy and administration.

Information about the benefits and harmful effects of caffeine consumption is easily available through the media. Compared with non-consumers, caffeine consumers have more interest and knowledge about the various components in beverages containing caffeine and its effects on the human body. However, caffeine drinkers may have overly high expectations of the beneficial effects of coffee on health. Overall, the Saudi participants from the Northern Border region do not drink the same type of caffeine, are not affected by opinion of friends in their caffeine choice, and cost is not an important factor to them in caffeine type selection.

STUDY LIMITATIONS

Limitation related to the location where the study was conducted as only students at University, secondary schools and people at malls were used as participants thus limiting generalization. Other limitations were that the data were self-reported, thus it may not be as accurate if participants were asked to track caffeine consumption over a period time.

CONCLUSION

Females consume and prefer coffee and tea more than males, while males prefer caffeinated energy drink and carbonated soft drinks more than females. The coffee and tea is the preferred caffeine containing beverage among academic educated people in northern border region, while caffeinated energy drinks and carbonated soft drinks are the preferred caffeine containing beverage among those with secondary education.

Mainly, the males begin drinking caffeinated beverages at younger age range than females. One cup/bottle is the main consumption daily rate among participant group. Large group of the study population reported that there's no certain cause for caffeine consumption followed by the response, to be alert and stay awake late at night. The headache is the main reported symptom to occur when delaying caffeine consumption than the usual time. Awareness about drug interaction with caffeine and caffeine risk on health were moderate. The main source of information reported to be the internet.

Appendix A: Survey Form

استخدام المشروبات المحتوية على الكافيين بواسطة سكان منطقة الحدود الشمالية

ملاحظة:

أنا الطالبة سلطانة الشمري من كلية الصيدلة الإكلينيكية, هذا الاستبيان لبحثي التخرج، وجميع البيانات سرية ولا تستخدم إلا لأغراض البحث العلمي, ويهدف إلى معرفة مدى استهلاك الكافيين ويحق لك المشاركة أو عدمها,وشكرا

مـا هو جنـسك؟

- ☐ ذكر
- ☐ أنثى

المستـوى التـعليمي:

- ☐ فوق جامعي
- ☐ جامعي
- ☐ ثانوي
- ☐ متوسط
- ☐ ابتدائي
- ☐ غير متعلم

أي من المشروبات التالية المحتوية على الكافيين تستخدم :

- ☐ قهوة
- ☐ شاي
- ☐ مشروبات الطاقة(ريد بول، كودرد، بايسن)
- ☐ المشروبات الغازية التي تحتوي على كافيين(بيبسي،كولا)

إلى أي فئة عمرية تنتمي عندما بدأت استهلاك الكافيين:

- ☐ ثمانية سنوات فأقل
- ☐ 8_12سنة
- ☐ 16_18 سنة
- ☐ 18_20 سنة
- ☐ عشرين سنة فأكثر

هل تعاني أي من الأمراض التالية:

- ☐ ارتفاع ضغط الدم
- ☐ السكري
- ☐ الربو
- ☐ أخرى.....

هل تستخدم أدوية لكل من التالي :

- ☐ ارتفاع ضغط الدم
- ☐ السكري
- ☐ الربو
- ☐ أخرى.....

هل لديك المعلومات عن تداخل الكافيين مع الأدوية:

- ☐ نعم
- ☐ لا

مصدر معلوماتك للتداخلات بين الكافيين والأدوية:

- ☐ الطبيب
- ☐ الصيدلي
- ☐ الانترنت
- ☐ أخرى.....

ما هي الأسباب التي دعت لاستخدام الكافيين (بإمكانك اختيار أكثر من خيار):

- ☐ أن تشعر بمزيد من اليقظة والبقاء حتى وقت متأخر
- ☐ لزيادة الطاقة والأداء البدني خلال اليوم
- ☐ للمساعدة على التركيز
- ☐ لم استهلك الكافيين لسبب محدد

كم مقدار الاستهلاك اليومي الكافيين:

- ☐ كوب
- ☐ كوبين
- ☐ ثلاثة أكواب
- ☐ أربعة أكواب
- ☐ أكثر من ذلك
- ☐

هل تشعر بأي أعراض عند توقف استهلاك الكافيين في الوقت المحدد:

- ☐ لا
- ☐ نعم "اذكرها"
- ☐ .....

فضلا ضع علامة ( ) أمام العبارة التي تتلاءم مع اختيارك من بين العبارات التالية:

	العبـارة	نـعم	لا
	دائما تستهلك نفس النوع من الكافيين		
	السعر دائما مهم في اختيار الكافيين		
	أصدقائك يؤثرون في اختيار الكافيين		
	استهلاك الكثير من الكافيين غير صحي		
	فوائد الكافيين المستهلكة تفوق المخاطر		
	هل تعاني من أي أمراض مزمنة		

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