

## Awareness and Regulatory Measures in Caffeine Addiction: Medical Statistical Review

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### Abstract

This study aimed at analyzing the degree of awareness and regulatory measures in the caffeine addiction within a medical statistical survey in Jordan, by attempting to answer the study two questions: What are the level of awareness and regulatory measures in caffeine addiction for positive psychological effects (alertness, attention and concentration)?, and: What are the level of awareness and regulatory measures in caffeine addiction for negative psychological effects (anxiety, depression and irritable)? The results of the study showed that there will be a statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the awareness of caffeine addiction for both positive psychological effects (alertness, attention and concentration) and negative psychological effects (anxiety, depression and irritable) in Jordan. The researchers recommended to educate university students about the importance of controlling their caffeine intakes, and encourage university students to exploit the medical information provided by the medical studies about the risks of high doses of caffeine intakes.

### Acknowledgement

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### 1.1 Introduction

Caffeine is among the most widely used drugs because of its ubiquitous occurrence in commonly consumed beverages such as coffee, tea and cola. Many drugs contain caffeine and are readily accessible to public. Clearly caffeine is an important drug food substance in our society which deserves attention.

The use and abuse of caffeine is a major public "habit" and may be as important as a factor as heredity and environment in the etiology of physiological and psychological disorders (Basse, Yama, Osinubi, Noronha & Okanlawon, 2011).

Caffeine (see figure 1) occurs naturally in more than 60 plants including coffee beans, tea leaves, kola nuts used to flavor soft drink colas, and cacao pods used to make chocolate products. Man-made caffeine is sometimes added to foods, drinks, and medicines. Ninety percent of people in the world use caffeine in one form or another. In Jordan, 82 percent of adults consume caffeine every day, and the average adult has an intake of (200 mg) per day. A study of 7th, 8th, and 9th grade students in Amman found that students took in an average of 53 mg of caffeine per day, but almost one in five students took in more than 100mg of caffeine each day (Ministry of health, 2016).

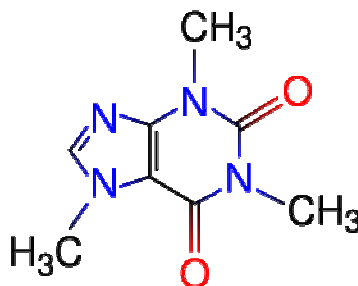


Figure (1): Caffeine chemical formula

Whether caffeine is consumed in food or as a medicine, it changes the way of the brain and body work, and changes behavior and the feel as caffeine is a central nervous system stimulant; the central nervous system includes brain, spinal cord, and the other nerves in the body. Caffeine's main effect on the body is to make it feel more awake and alert for a while, but it can also cause problems (Food and Drug Administration, 2007).

A study conducted by University of Washington in 2007 shows the caffeine content in the most common food and drink, and table (1) shows these caffeine contents in the most common food and drink habits in the world wide. And the figures in table (1) show that the highest content of caffeine is in coffee, tea and cola.

Table (1): Caffeine content in common drinks and foods

| Item                | Item size    | Caffeine (mg) |
|---------------------|--------------|---------------|
| Coffee              | 150 ml       | 60-150 mg     |
| Coffee, decaf       | 150 ml       | 2-5 mg        |
| Tea                 | 150 ml       | 40-80 mg      |
| Hot Cocoa           | 150 ml       | 1-8 mg        |
| Chocolate Milk      | 225 ml       | 2-7 mg        |
| Coca Cola           | 330 ml       | 64 mg         |
| Pepsi Cola          | 330 ml       | 48 mg         |
| Kit Kat Bar         | 1 bar (46 g) | 5 mg          |
| Chocolate Ice Cream | 50 g         | 2-5 mg        |

Also figure (2) below shows a histogram of the caffeine content in some other common drinks and foods.

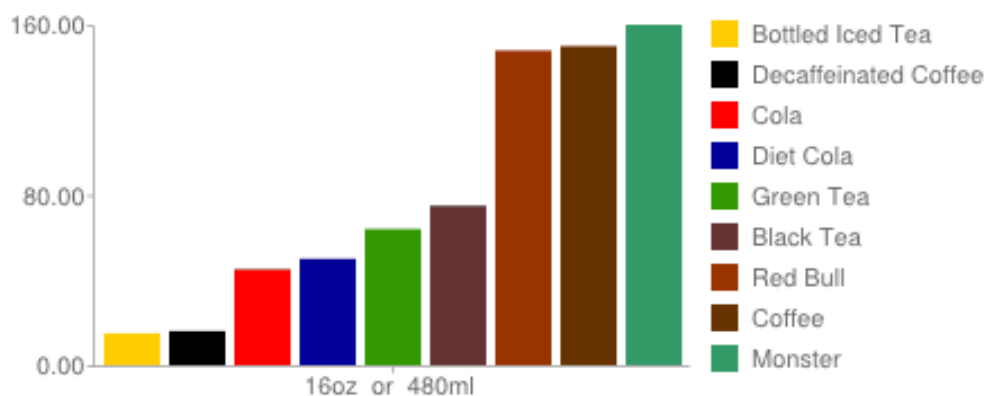


Figure (2): Typical caffeine content

From an early start, people are socialized to consume caffeine. As a child, getting to eat chocolate is a treat. As people get older, soda is a caffeinated product that many enjoy and drink in social settings. Often, people do not consume caffeinated substances for certain health benefits, rather they like the taste and enjoyment associated with the product (Ennis, 2014).

Because of the wide spread use of caffeine and its known potent physiological effects, caffeine has been the subject of research in psychological related studies. This work has been stimulated by personal experiences and observations as well as by efforts to understand its action and mechanism (Bolton & Null, 1981).

Caffeine, which is among the mostly widely used and accepted drugs, is not recognized as a potent central nervous system stimulant, although it is. Caffeine causes an array of psychological effects due to the chemical action of this drug. Caffeine stimulates the central nervous system first and at higher doses it effects the cortex, medulla and even spinal cord (Foad, Beedie & Coleman, 2008).

Caffeine can cause numerous amounts of psychological effects depending upon the individual and the concentration. Children are much more susceptible to caffeine intake symptoms and should drastically limit their intake. One or two cups of coffee (150-250 mg of caffeine) can have seriously detrimental effects on one's mental state. An intake of just 100 mg of caffeine can induce such symptoms as dizziness, anxiety, agitation and irritability, restlessness, insomnia, and headaches in some people. Those who regularly ingest caffeine, whether in pills, food, or beverage, would be less susceptible to these effects at a low concentration but have other issues to face (Lara, 2010).

Caffeine is a drug and with repetitive drug intake the body can form a dependence. This can occur within 6 to 15 days of exposure. If caffeine is not consumed regularly after this period one may feel lethargic or apathetic until the drug is ingested. Individuals addicted to caffeine begin to show symptoms of withdrawal 12-24 hours after intake is stopped. Depending on the individual, the usual symptoms of withdrawal include headache, fatigue, apathy, and even anxiety is sometimes expressed. These symptoms peak around 36 hours and continue for up to a week after caffeine deprivation. The body's mechanism of withdrawal can be reduced through dose

tapering and/or analgesics (Rassool, 2011).

Large doses of caffeine can cause another type of disorder known as caffeinism. In a human, an intake of 650 mg of caffeine per day can lead to this syndrome. This amount can lead to aggressiveness and psychotic behavior. This syndrome is indistinguishable from the mental disorder anxiety neurosis making the individual appear confused or confounded with true psychotic states. Although much caffeine must be ingested for caffeinism to set in, sleep is very vulnerable to even the slightest caffeine intake (Vilarim, Rocha & Nardi, 2011).

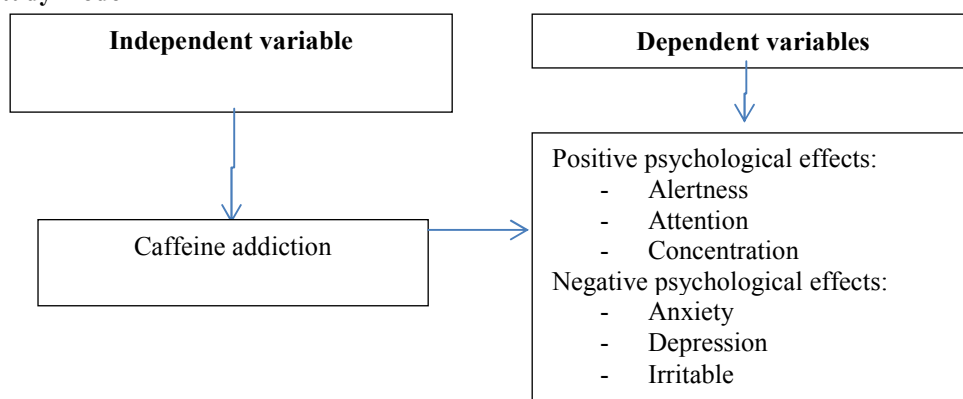
### 1.2 Problem statement and questions of the study

With caffeine playing an important role in our social world and not having any restrictions to its use, consumers should be educated about health risks due to caffeine consumption. The researchers first goal is to examine the proposed health risks of caffeine consumption and whether there is a direct correlation to psychological health problems (Sarafino & Smith, 2014).

And because caffeine can have different stimulation effects from person to person based on factors including his or her height, weight, metabolism, activity level, and tolerance; this study will analyze the awareness and regulatory measures in caffeine addiction for both positive psychological effects (alertness, attention and concentration) and negative psychological effects (anxiety, depression and irritable). Therefore, the problem of this study lies in the attempt to answer the following two questions:

1. What are the level of awareness and regulatory measures in caffeine addiction for positive psychological effects (alertness, attention and concentration)?
2. What are the level of awareness and regulatory measures in caffeine addiction for negative psychological effects (anxiety, depression and irritable)?

### 1.3 Study model



### 1.4 Study hypotheses

In light of the problem of the study, and through its questions, the researchers have adopted the following hypotheses:

#### 1.4.1 Major hypothesis

**H0:** There will be no statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the awareness of caffeine addiction for both positive psychological effects (alertness, attention and concentration) and negative psychological effects (anxiety, depression and irritable) in Jordan.

#### 1.4.1.1 Sub-hypotheses:

The ramifications of the major hypothesis are the following sub-hypotheses:

**H01:** There will be no statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the awareness of caffeine addiction for the positive psychological effect (alertness) in Jordan.

**H02:** There will be no statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the awareness of caffeine addiction for the positive psychological effect (attention) in Jordan.

**H03:** There will be no statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the awareness of caffeine addiction for the positive psychological effect (concentration) in Jordan.

**H04:** There will be no statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the awareness of caffeine addiction for the negative psychological effect (anxiety) in Jordan.

**H05:** There will be no statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the awareness of caffeine addiction for the negative psychological effect (depression) in Jordan.

**H06:** There will be no statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the awareness of caffeine addiction for the negative psychological effect (irritable) in Jordan.

## 1.5 Terminology

**Caffeine:** A bitter alkaloid  $C_8H_{10}N_4O_2$  found especially in coffee, tea, cacao, and kola nuts and used medicinally as a stimulant and diuretic (Nonthakaew, Matan, Aewsiri & Matan, 2015).

**Addiction:** compulsive need for and use of a habit-forming substance (such as heroin, nicotine, or alcohol) characterized by tolerance and by obvious and well-defined physiological symptoms upon withdrawal; *broadly* : persistent compulsive use of a substance known by the user to be harmful (Hebebrand, Albayrak, Adan, Antel, Dieguez, de Jong van der Plasse, 2014).

**Alertness:** Fully aware and attentive, and an attitude of vigilance, readiness or caution (Hartman & Zimberoff, 2008).

**Attention:** A condition of readiness for such attention involving especially a selective narrowing or focusing of consciousness and receptivity (Ruz, 2006).

**Concentration:** The ability to give your attention or thought to a single object or activity (Bishop, Lau, Shapiro, Carlson, Anderson, Carmody & Devins, 2004).

**Anxiety:** The term anxiety refers to feelings of worry, nervousness, apprehension, or fear; besides that, anxiety is the anticipation of impending danger and dread accompanied by restlessness, tension, rapid heartbeat, and rapid breathing that may or may not be associated with a certain event or situation (Vanin, 2008).

**Depression:** Is a common and serious medical illness that negatively affects feelings, the way of thinking and acting. Depression is also a mood disorder that causes a persistent feeling of sadness and loss of interest. Also called major depressive disorder or clinical depression (Beck & Alford, 2009).

**Irritable:** Becoming annoyed or angry very easily, and the ability to be excited to a characteristic action (Hendricks, Aslinia & Morriss, 2013).

## 1.6 Literature review

### 1.6.1 Caffeine addiction psychological effects

The literature suggests that the following effects on behavior of adult humans may occur when individuals consume moderate amounts of caffeine (Smith, 2002):

1. Caffeine increases alertness and reduces fatigue. This may be especially important in low arousal situations (e.g. working at night).
2. Caffeine improves performance on vigilance tasks and simple tasks that require sustained response. Again, these effects are often clearest when alertness is reduced, although there is evidence that benefits may still occur when the person is unimpaired.
3. Effects on more complex tasks are difficult to assess and probably involve interactions between the caffeine and other variables which increase alertness (e.g. personality and time of day).
4. In contrast to the effects of caffeine consumption, withdrawal of caffeine has few effects on performance. There is often an increase in negative mood following withdrawal of caffeine, but such effects may largely reflect the expectancies of the volunteers and the failure to conduct "blind" studies.
5. Regular caffeine usage appears to be beneficial, with higher users having better mental functioning.
6. Most people are very good at controlling their caffeine consumption to maximize the above positive effects. For example, the pattern of consumption over the day shows that caffeine is often consumed to increase alertness.

Indeed, many people do not consume much caffeine later in the day since it is important not to be alert when one goes to sleep. In contrast to effects found from normal caffeine intake, there are reports that have demonstrated negative effects when very large amounts are given or sensitive groups (e.g. patients with anxiety disorders) were studied. In this context caffeine has been shown to increase anxiety and impair sleep. There is also some evidence that fine motor control may be impaired as a function of the increase in anxiety. Overall, the global picture that emerges depends on whether one focuses on effects that are likely to be present when caffeine is consumed in moderation by the majority of the population or on the effects found in extreme conditions. The evidence clearly shows that levels of caffeine consumed by most people have largely positive effects on behavior. Excessive consumption can lead to problems, especially in sensitive individuals (Heckman, Weil, Mejia & Gonzalez, 2010).

Caffeine can bring about various measures of psychological effects (**table 2**) relying on the individual and the concentration. Low doses of caffeine cause augmented alertness and diminished weariness. In moderate doses, caffeine may lessen symptoms of depression and lower suicide chance while high dosages can bring about the repulsive impacts of caffeinism.

One or two cups of coffee (i.e., 150 to 250 mg of caffeine) can have truly unfavorable impacts on one's mental state. A consumption of only 100 mg of caffeine can prompt such symptoms as dizziness, anxiety, irritability, restlessness, sleep deprivation and headaches in few people. The individuals who frequently ingest caffeine, whether in pills, food or beverage, would be less vulnerable to these impacts at a low concentration yet

have different issues to confront (Persad, 2011).

Caffeine is a drug and with repetitive administration it allows the body to develop dependence. This can happen within 6 to 15 days of administration. In the event that caffeine is not devoured routinely after this period one may feel lethargic until the drug is ingested. People dependent on caffeine start to show symptoms of withdrawal after admission is halted for the period of 12 to 24 h. Contingent upon the individual, the standard symptoms of withdrawal incorporate headache, weariness, lack of care and even anxiety. These symptoms crest around 36 h and proceed for up to 1 week after caffeine deficiency. The body's system of withdrawal can be decreased through dose adjustments or through analgesic drugs.

Table (2): Positive and negative psychological impacts of caffeine

| Positive Effect | Negative Effect |
|-----------------|-----------------|
| Alertness       | Anxiety         |
| Attention       | Depression      |
| Concentration   | Irritable       |
| Focus           | Addiction       |

### 1.6.2 Effects of caffeine on the central nervous system

The most obvious effect of caffeine is alertness. At the larger amounts, it stimulates the central nervous system CNS, the cortex subsequently medulla and just later stimulates the spinal cord. Its effects instigate within one hour and keep going for three to four hours. In fact slight incitement of cortex is gainful for clear and critical thinking. Numerous findings recommended caffeine ingestion is connected with enhanced attention and fortified night driving. The onset of the caffeine shows up within one hour and goes on for three to four hours (Uddin, Sufian, Hossain, Kabir, Islam, Rahman & Rafe, 2017).

### 1.6.3 Caffeine withdrawal

A lot of rigorous double-blind studies showed the caffeine withdrawal syndrome. The possibility of caffeine withdrawal that may result in clinically significant distress or impairment in functioning is revealed by the state of including caffeine withdrawal as an official diagnosis in the ICD-10, DSM-IV and DSM-5. Although most research provides an idea of withdrawal that has been conducted by adults, but there are also some evidences that children experience withdrawal effects during caffeine abstinence.

There are many symptoms experiencing while withdrawing caffeine. Not everyone is going to experience all of these symptoms. Some may feel headache and sluggish. Some others may have a variety of symptoms that may make life difficult to deal with for a couple of weeks (Mental health daily, 2016).

The most commonly reported withdrawal symptoms are headache, fatigue, drowsiness, dysphoric mood, irritability, depression, nausea, muscle aches and impairment of cognitive or behavioral performances.

## 1.7 Methods and procedures

### 1.7.1 The study Sample

The study sample was selected between January and June 2017 from the students of the university of Jordan. The study sample size was (200) students of all level. And table (3) shows the demographical characteristics of the study sample.

Table (3): Demographical characteristics of the study sample

| Variable | Frequency   |     |
|----------|-------------|-----|
| Gender   | Male        | 130 |
|          | Female      | 70  |
| Total    | 200         |     |
| Level    | First year  | 33  |
|          | Second year | 51  |
|          | Third year  | 58  |
|          | Forth year  | 52  |
| Total    | 200         |     |

Upon the caffeine content in common drinks and foods showed in table (1), the caffeine intakes for the study sample are shown in table (4).

Table (4): Average caffeine intakes for the study sample

| Variable | Average caffeine intakes per day |        |
|----------|----------------------------------|--------|
| Gender   | Male                             | 400 mg |
|          | Female                           | 360 mg |
| Level    | First year                       | 450 mg |
|          | Second year                      | 390 mg |
|          | Third year                       | 440 mg |
|          | Forth year                       | 500 mg |

### 1.7.2 The study tool

The study relied mainly on the self-managed questionnaire designed and prepared by the researcher. After examining the literature and theoretical studies relevant to the subject of this study; whether in periodicals, books or other references, the questionnaire was formed in three parts and as follows:

**Part I:** Includes information relating to the respondents and their demographic data.

**Part II:** Includes two dimensions:

1. (12) paragraph related to the measurement of the positive psychological effects (alertness, attention and concentration) of the caffeine addiction.
2. (12) paragraph related to the measurement of the negative psychological effects (anxiety, depression and irritable).

The questionnaire paragraphs was built upon the five-point Likert scale; to measure the variables of the study, and for the purposes of the analysis the weights of the answers were distributed as shown in the figure (3):

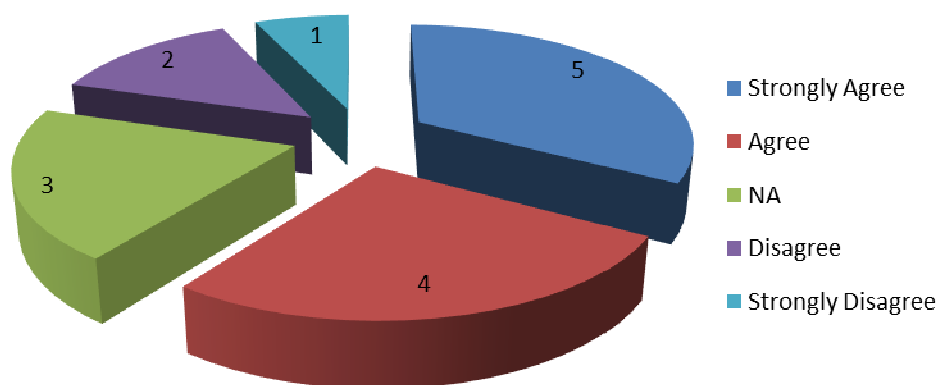


Figure (3): Graphic distribution of the response options in the questionnaire according to the five-point Likert scale.

## 1.8 Study results and findings

### 1.8.1 Positive psychological effects

The positive psychological effects (alertness, attention and concentration) of the caffeine addiction is measured in paragraphs (1-12), as illustrated in table (5), and that the arithmetical means for answers of the study sample ranged between (4.02 - 3.22) for alertness, (4.10 - 2.67) for attention, and (3.98 - 3.12) for concentration.

All of these arithmetic means shows the approval of the study sample on the paragraphs that measure the positive psychological effects (alertness, attention and concentration) of the caffeine addiction, since all the arithmetic means are greater than the default mean.

Also noted that the paragraph, which states "Drinking coffee and tea and other foods containing caffeine makes me alert all the time" had the highest approval grades for alertness; as its arithmetic mean was (4.02), while the paragraph, which states "There is no connection between consuming caffeine and alertness" had the lowest approval grades; as its arithmetic mean was (3.22). And for attention, the paragraph, which states "Drinking coffee and tea and other foods containing caffeine increases my attention all the time" had the highest approval grades for alertness; as its arithmetic mean was (4.10), while the paragraph, which states "There is no connection between consuming caffeine and attention" had the lowest approval grades; as its arithmetic mean was (2.67). And for concentration, the paragraph, which states "Drinking coffee and tea and other foods containing caffeine increases my concentration all the time" had the highest approval grades for alertness; as its arithmetic mean was (3.89), while the paragraph, which states "There is no connection between consuming caffeine and concentration" had the lowest approval grades; as its arithmetic mean was (2.89).

Overall, the general averages of the arithmetic mean for the answers of the respondents is equivalent on the alertness, attention and concentration are (3.64, 3.36, 3.45), which indicates the approval of the respondents upon the scale of these paragraphs was medium, and that their attitudes were positive.

Table (5): Arithmetic means and standard deviations for the members of the study sample answers measuring the positive psychological effects of the caffeine addiction.

| Positive psychological effects |  |      |       |      |        |
|--------------------------------|--|------|-------|------|--------|
| Alertness                      |  |      |       |      |        |
| NO                             | Statement  | A M  | S D   | Rank | Grade  |
| 1                              | I think I consume too much caffeine every day  | 3.56 | 0.813 | 3    | Medium |
| 2                              | Drinking coffee and tea and other foods containing caffeine makes me alert all the time                    | 4.02 | 0.775 | 1    | High   |
| 3                              | There is no connection between consuming caffeine and <b>alertness</b>                                     | 3.22 | 0.787 | 4    | Medium |
| 4                              | If I didn't take coffee every day I feel lazy  | 3.75 | 0.803 | 2    | High   |
| General average                |  | 3.64 | 0.795 |      | Medium |
| Attention                      |  |      |       |      |        |
| 5                              | Drinking coffee and tea and other foods containing caffeine increases my <b>attention</b> all the time     | 4.10 | 0.776 | 1    | High   |
| 6                              | There is no connection between consuming caffeine and <b>attention</b>                                     | 2.67 | 0.803 | 4    | Medium |
| 7                              | When I need to be attended I drink a cup of coffee   | 3.61 | 0.796 | 2    | Medium |
| 8                              | I think consuming caffeine is a habit that harms the human being   | 3.05 | 0.801 | 3    | Medium |
| General average                |  | 3.36 | 0.794 |      | Medium |
| Concentration                  |  |      |       |      |        |
| 9                              | When I need to be <b>concentrated</b> I drink a cup of coffee  | 3.47 | 0.799 | 3    | Medium |
| 10                             | There is no connection between consuming caffeine and <b>concentration</b>                                 | 2.89 | 0.817 | 4    | Medium |
| 11                             | Drinking coffee and tea and other foods containing caffeine increases my <b>concentration</b> all the time | 3.89 | 0.773 | 1    | High   |
| 12                             | Consuming more caffeine means more <b>concentration</b>  | 3.55 | 0.801 | 2    | Medium |
| General average                |  | 3.45 | 0.798 |      | Medium |

### 1.8.2 Negative psychological effects

The negative psychological effects (anxiety, depression and irritable) of the caffeine addiction is measured in paragraphs (13-24), as illustrated in table (6), and that the arithmetical means for answers of the study sample ranged between (4.11 - 2.21) for anxiety, (3.99 - 2.44) for depression, and (3.88 - 3.01) for irritable.

All of these arithmetic means shows the approval of the study sample on the paragraphs that measure the positive psychological effects (alertness, attention and concentration) of the caffeine addiction, since all the arithmetic means are greater than the default mean.

Also noted that the paragraph, which states "My caffeine intakes are high and I am always anxious" had the highest approval grades for anxiety; as its arithmetic mean was (4.11), while the paragraph, which states "There is no connection between consuming caffeine and anxiety" had the lowest approval grades; as its arithmetic mean was (2.21). And for depression, the paragraph, which states "My caffeine intakes are high and I am always depressed" had the highest approval grades for alertness; as its arithmetic mean was (3.99), while the paragraph, which states "There is no connection between consuming caffeine and depression" had the lowest approval grades; as its arithmetic mean was (2.44). And for irritable, the paragraph, which states "My caffeine intakes are high and I am always irritable" had the highest approval grades for alertness; as its arithmetic mean was (3.88), while the paragraph, which states "There is no connection between consuming caffeine and irritability" had the lowest approval grades; as its arithmetic mean was (3.01).

Overall, the general averages of the arithmetic mean for the answers of the respondents is equivalent on the anxiety, depression and irritable are (3.35, 3.35, 3.43), which indicates the approval of the respondents upon the scale of these paragraphs was medium, and that their attitudes were positive.

Table (6): Arithmetic means and standard deviations for the members of the study sample answers measuring the negative psychological effects of the caffeine addiction.

| Positive psychological effects |   |      |       |      |        |
|--------------------------------|---|------|-------|------|--------|
| Anxiety                        |   |      |       |      |        |
| NO                             | Statement   | A M  | S D   | Rank | Grade  |
| 13                             | When I drink coffee the feelings of <b>anxiety vanish</b>                 | 3.45 | 0.789 | 3    | Medium |
| 14                             | There is no connection between consuming caffeine and <b>anxiety</b>      | 2.21 | 0.814 | 4    | Medium |
| 15                             | Consuming more caffeine increases the <b>anxiety</b>                      | 3.61 | 0.787 | 2    | Medium |
| 16                             | My caffeine intakes are high and I am always anxious                      | 4.11 | 0.774 | 1    | High   |
| General average                |   | 3.35 | 0.791 |      | Medium |
| Depression                     |   |      |       |      |        |
| 17                             | When I drink coffee I am depressed no more                                | 3.36 | 0.801 | 3    | Medium |
| 18                             | My caffeine intakes are high and I am always depressed                    | 3.99 | 0.775 | 1    | High   |
| 19                             | There is no connection between consuming caffeine and <b>depression</b>   | 2.44 | 0.820 | 4    | Medium |
| 20                             | Consuming more caffeine increases the <b>depression</b>                   | 3.61 | 0.802 | 2    | Medium |
| General average                |   | 3.35 | 0.799 |      | Medium |
| Irritable                      |   |      |       |      |        |
| 21                             | When I drink coffee I am <b>irritable</b> no more                         | 3.51 | 0.798 | 2    | Medium |
| 22                             | There is no connection between consuming caffeine and <b>irritability</b> | 3.01 | 0.817 | 4    | Medium |
| 23                             | Consuming more caffeine increases the <b>irritability</b>                 | 3.33 | 0.802 | 3    | High   |
| 24                             | My caffeine intakes are high and I am always <b>irritable</b>             | 3.88 | 0.778 | 1    | Medium |
| General average                |   | 3.43 | 0.799 |      | Medium |

### 1.9 Testing the Study Hypotheses

In order to test the hypotheses of the study, of statistical methods were used with the appropriate tests to the nature of the variables and assumptions, using the simple linear regression and the multiple linear regression analysis so as to put the base of acceptances or rejections the hypothesis as follows:

1. If the calculated value of (T) is higher than the tabulated (T) value at the level of ( $\alpha = 0.05$ ), the result will be rejection for the null or the zero hypothesis (H0) and the alternative hypothesis (H1) will be accepted, which indicates the statistically significant relationship effect.
2. If the calculated value of (T) is less than the tabulated (T) value at the level of ( $\alpha = 0.05$ ), the result will be accepted for the null or the zero hypothesis (H0) and the alternative hypothesis (H1) will be rejected, which indicates no statistically significant relationship effect.
3. If the calculated value of (F) is higher than the tabulated (F) value at the level of ( $\alpha = 0.05$ ), the result will be rejection for the null or the zero hypothesis (H0) and the alternative hypothesis (H1) will be accepted, which indicates the statistically significant relationship effect.
4. If the calculated value of (F) is less than the tabulated (F) value at the level of ( $\alpha = 0.05$ ), the result will be accepted for the null or the zero hypothesis (H0) and the alternative hypothesis (H1) will be rejected, which indicates no statistically significant relationship effect.

#### 1.9.1 Testing the major hypothesis

**H0:** There will be no statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the awareness of caffeine addiction for both positive psychological effects (alertness, attention and concentration) and negative psychological effects (anxiety, depression and irritable) in Jordan.

In order to test the major hypothesis, the sub-hypotheses must be tested first.

#### 1.9.2 Testing the first sub-hypothesis

**H01:** There will be no statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the awareness of caffeine addiction for the positive psychological effect (alertness) in Jordan.

It is noted from simple regression analysis results described in table (7) that there is a statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the awareness of caffeine addiction for the positive psychological effect (alertness) in Jordan.

This statistically significant differences at the statistically significant level ( $\alpha=0.05$ ), as the calculated (T) value is (8.342), which is higher than tabulated (T) value, is in line with the simple regression analysis results that explain the (0.196%) variance.

According to that the null hypothesis (H01) will be rejected and the alternative hypothesis will be accepted,



that means there is a statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the awareness of caffeine addiction for the positive **psychological effect (alertness) in Jordan.**

Table (7): Testing results of the first sub hypothesis

| Significant (T) | Calculated (T) | Tabulated (T) | (R) Square   | (R)          |
|-----------------|----------------|---------------|--------------|--------------|
| <b>0.001</b>    | <b>8.342</b>   | <b>1.960</b>  | <b>0.196</b> | <b>0.456</b> |

### 1.9.3 Testing the second sub hypothesis

**H02:** There will be no statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the awareness of caffeine addiction for the positive psychological effect (attention) in Jordan.

It is noted from simple regression analysis results described in table (8) that there is a statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the satisfaction of the awareness of caffeine addiction for the positive psychological effect (attention) in Jordan.

This statistically significant effect at the statistically significant level ( $\alpha=0.05$ ), as the calculated (T) value is (11.452), which is higher than tabulated (T) value, is in line with the simple regression analysis results that explain the (36.0%) variance.

According to that the null hypothesis (H02) will be rejected and the alternative hypothesis will be accepted, that means there is a statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the awareness of caffeine addiction for the positive psychological effect (attention) in Jordan.

Table (8): Testing results of the second sub hypothesis

| Significant (T) | Calculated (T) | Tabulated (T) | (R) Square   | (R)          |
|-----------------|----------------|---------------|--------------|--------------|
| <b>0.000</b>    | <b>11.452</b>  | <b>1.960</b>  | <b>0.360</b> | <b>0.634</b> |

### 1.9.4 Testing the third sub hypothesis

**H03:** There will be no statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the awareness of caffeine addiction for the positive psychological effect (concentration) in Jordan.

It is noted from simple regression analysis results described in table (9) that there is a statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the satisfaction of the awareness of caffeine addiction for the positive psychological effect (concentration) in Jordan.

This statistically significant effect at the statistically significant level ( $\alpha=0.05$ ), as the calculated (T) value is (9.113), which is higher than tabulated (T) value, is in line with the simple regression analysis results that explain the (21.0%) variance.

According to that the null hypothesis (H03) will be rejected and the alternative hypothesis will be accepted, that means there is a statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the awareness of caffeine addiction for the positive psychological effect (concentration) in Jordan.

Table (9): Testing results of the third sub hypothesis

| Significant (T) | Calculated (T) | Tabulated (T) | (R) Square   | (R)          |
|-----------------|----------------|---------------|--------------|--------------|
| <b>0.002</b>    | <b>9.113</b>   | <b>1.960</b>  | <b>0.210</b> | <b>0.771</b> |

### 1.9.5 Testing the fourth sub hypothesis

**H04:** There will be no statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the awareness of caffeine addiction for the negative psychological effect (anxiety) in Jordan.

It is noted from simple regression analysis results described in table (10) that there is a statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the satisfaction of the awareness of caffeine addiction for the negative psychological effect (anxiety) in Jordan.

This statistically significant effect at the statistically significant level ( $\alpha=0.05$ ), as the calculated (T) value is (15.432), which is higher than tabulated (T) value, is in line with the simple regression analysis results that explain the (19.0%) variance.

According to that the null hypothesis (H04) will be rejected and the alternative hypothesis will be accepted, that means there is a statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the awareness of caffeine addiction for the negative psychological effect (anxiety) in Jordan.

Table (10): Testing results of the fourth sub hypothesis

| Significant (T) | Calculated (T) | Tabulated (T) | (R) Square   | (R)          |
|-----------------|----------------|---------------|--------------|--------------|
| <b>0.000</b>    | <b>15.432</b>  | <b>1.960</b>  | <b>0.190</b> | <b>0.567</b> |

### 1.9.6 Testing the fifth sub hypothesis

**H05:** There will be no statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the awareness of caffeine addiction for the negative psychological effect (depression) in Jordan.

It is noted from simple regression analysis results described in table (11) that there is a statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the satisfaction of the awareness of caffeine addiction for the negative psychological effect (depression) in Jordan.

This statistically significant effect at the statistically significant level ( $\alpha=0.05$ ), as the calculated (T) value is (12.776), which is higher than tabulated (T) value, is in line with the simple regression analysis results that

explain the (22.0%) variance.

According to that the null hypothesis (H05) will be rejected and the alternative hypothesis will be accepted, that means there is a statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the awareness of caffeine addiction for the negative psychological effect (depression) in Jordan.

Table (11): Testing results of the fifth sub hypothesis

| Significant (T) | Calculated (T) | Tabulated (T) | (R) Square | (R)   |
|-----------------|----------------|---------------|------------|-------|
| 0.001           | 12.776         | 1.960         | 0.220      | 0.423 |

### 1.9.7 Testing the sixth sub hypothesis

**H06:** There will be no statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the awareness of caffeine addiction for the negative psychological effect (irritable) in Jordan.

It is noted from simple regression analysis results described in table (12) that there is a statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the satisfaction of the awareness of caffeine addiction for the negative psychological effect (irritable) in Jordan.

This statistically significant effect at the statistically significant level ( $\alpha=0.05$ ), as the calculated (T) value is (9.256), which is higher than tabulated (T) value, is in line with the simple regression analysis results that explain the (20.0%) variance.

According to that the null hypothesis (H06) will be rejected and the alternative hypothesis will be accepted, that means there is a statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the awareness of caffeine addiction for the negative psychological effect (irritable) in Jordan.

Table (12): Testing results of the sixth sub hypothesis

| Significant (T) | Calculated (T) | Tabulated (T) | (R) Square | (R)   |
|-----------------|----------------|---------------|------------|-------|
| 0.003           | 9.256          | 1.960         | 0.200      | 0.871 |

Upon testing results of the sub hypotheses, the major null hypothesis (H0) will be rejected and the alternative hypothesis will be accepted, that means there will be a statistically significant differences at the level of significance ( $\alpha=0.05$ ) of the awareness of caffeine addiction for both positive psychological effects (alertness, attention and concentration) and negative psychological effects (anxiety, depression and irritable) in Jordan.

### 1.10 Recommendations

Upon the study results, and upon the answers of the study sample respondents concerning the the awareness of caffeine addiction for both positive psychological effects (alertness, attention and concentration) and negative psychological effects (anxiety, depression and irritable) in Jordan, the researchers recommended the following recommendations:

1. Educate university students about the importance of controlling their caffeine intakes.
2. Encourage university students to exploit the medical information provided by the medical studies about the risks of high doses of caffeine intakes.
3. Conduct workshops and educational bulletins among university students and the local community about the controlling the caffeine intakes.
4. Conduct further researches with surveying more variables and dimensions about the risks of high doses of caffeine intakes.

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