Research Article
AMERICAN JOURNAL OF PHARMACY AND HEALTH RESEARCH
www.ajphr.com
2014, Volume 2, Issue 7
ISSN:2321–3647(online)

Primary Insomnia Induced by Caffeine Consumption: A Non-Pharmacological/behavioral Remedy

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ABSTRACT

Insomnia, the most common type of sleep disorder is fast encroaching cavernously into the global community. The impact and correlation of insomnia with caffeinated food and beverages is often under-estimated. Failure to identify caffeine as the culprit in most cases of insomnia and many psychiatric problems may result in false diagnosis of anxiety, depression and related disorders. Without a quantitative listing of caffeine on food labels, consumers lack the information needed to control their intake of caffeine. There is paucity of data from various locales to support the basis and outcome of insomnia, in the developed countries especially Nigeria. A quantitative survey of 120 respondents receiving treatment for primary insomnia was investigated in three primary, secondary and tertiary institutions in Port Harcourt, from June 2012 to June 2013. Findings divulged the role caffeine played at the end of acute treatment, given that diminished use of caffeinated food/beverages exhibited a comparable efficacy in quality of sleep than most pharmacotherapy. We deduced that caffeine induced insomnia is a growing major public health concern in the Sub Saharan region especially in Nigeria. Excessive use of caffeine and many other substances that alter sleep-wake circle constitute a significant etiological factor for most insomnia. This article deserves the attention of the National Agency for Food and Drug Administration Control (NAFDAC) in Nigeria, as the authors urge NAFDAC to ensure that a routine quantitative labeling of caffeine content in food and beverages, be made a material factor for consumers.

Keywords: Insomnia, Caffeine Consumption, Labeling, NAFDAC, Nigeria.

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Received 11May 2014, Accepted 09 June 2014

Please cite this article in press as: Aburoma HLS*et al.*, Primary Insomnia Induced by Caffeine Consumption: A Non-Pharmacological/behavioral Remedy. American Journal of Pharmacy & Health Research 2014.

INTRODUCTION

Sleep is an essential element of good health. It is one of the most basic physiological needs of human beings [1]. For over one hundred years, sleep has been studied both subjectively and objectively, but the true mechanisms of how sleep restores the function of the body and mind remains a perturbing question [2]. Renowned sleep experts define persistent insomnia as difficulty with initiating and/or maintaining sleep at least three nights in a week accompanied by daytime distressor impairment [1]; precisely this is associated with an array of individual and public health anomalies, embracing vast a medical and psychiatricmorbidity [2]. In recent times, insomnia remains one of the most apprehensive societal dilemmas emanating from the consumption of caffeinated substances either in food, drink, or medication. Insomnia becomes a problem when excessive daytime sleepiness impairs feeling well and performing functions that require alertness due to the untoward effects of fragmented sleep. Most hazardous accidents that impede qualityof life, alter efficient job performances and generate job absenteeism have all been traced to insomnia[3]. Sleep experts noted that drowsiness is blamed for some 200,000 to 400,000 automobile accidents a year, accounting for almost half of all accident-related deaths in the United States [1- 4]. Expert Commission Report to Congress linked sleep deprivation to increased psychosocial problems such as illness, death, diminished job productivity &poor performances [5]. It names fatigue and drowsiness as contributors to accidents in hospitals, military operations, the nuclear industry, major air mishaps, rail, road, and sea transportation disasters. Air plane mishaps and the collision of rail road freight trains which resulted in loss of lives and millions of dollar damages are among several catastrophes cited [6]. While researchers want to learn more about the instigating factors of sleep deprivation and its ramifications for various reasons; the layman out there should be made to understand the link between insomnia and caffeine laden food drinks that they are exposed to. Insomnia affects nearly one-third of adults at some point in their lives and is categorized into three different parts:

- Transient Insomnia: Short term sleeping difficulties that recur infrequently or not at all.
- Intermittent Insomnia: Recurring bouts of insomnia, followed by periods of relatively normal sleep.
- Chronic Insomnia: Persistent sleeping difficulties that last for more than one month.

The burden of insomnia is particularly unfortunate given that it can be readily diagnosed, treated and could be prevented. It often responds well to changes in lifestyle, modification in the type and the amount of food consumption and, if necessary, short term use of medication. Insomnia is

a common complaint which usually results from stress or the administration of some prescription drugs that could be managed by reduced caffeine use, behavioral means, and other non-pharmacologic treatments [7].

Healthcare practitioners can be a vital tool to help identify the underlying causes of sleeplessness and get the clientele back on the path to a regular, restful sleep cycle. Caffeine is known to cause insomnia and it is a drug, and inadvertently the most widely used drug; and people who drink cola, coffee, tea, or use over the counter (OTC) caffeine containing medications are all potential and vulnerable candidates for caffeine induced insomnia. Caffeine in food/drink is an important factor that modifies the psychological state of its consumers; at lower doses the effects appear to be beneficial however, at higher doses, the reverse may be the case due to its toxic and rebound effects. Although it acts as a pleasurable stimulant at low doses on the one hand, on the other hand, this may be replaced by psychological symptoms that mimic anxiety and depressive neuroses at high doses due to its central nervous system stimulating activity [8]; accordingly task oriented performance, attention, and concentrations may be altered by caffeine. For this reason, the diagnosis of any psychological conditions must take caffeine usage into account since those with more severe psychological problems may have their symptoms exaggerated with excessive caffeine usage, or such symptoms can actually be caused by preceding excess[9 & 10]. Nurses in particular should be held accountable in patient teaching regarding the effects of caffeine use and insomnia, because nursing is the core to patient care, in view of the fact that nurses have the greatest contact with patients more than any other health care worker in the healthcare setting.

The virtue of caffeine is to assuage sleep and drowsiness, and it is the only OTC stimulant approved by the United States of American Food and Drug Administration (FDA)[11 & 12].The adverse effects of caffeinated food/drink' and its nuisance on the community necessitates a quantitative listing of caffeine contents in food necessary for consumers' awareness[13], without which consumers lack the information needed to control their intake of caffeine particularly on women of child bearing age. For instance, pregnant women lack the information they need to follow in the advice to avoid or limit their intake of caffeine in most developing countries. The recommended amount of caffeine consumption as stipulated by FDA, for pregnant women is limited to less than 300 mg of caffeine a day – the equivalent of four cups of coffee a day. A higher intake may be associated with miscarriages and fetal anomalies [14]. Box I - I [Appendix A], quantifies caffeinated products as per serving size and portion. Regrettably none of the preceding information is available for pregnant females who probably drink as much as 400-

600mg of caffeine in bid to abate their cravings remarkably in the underserved areas of the globe. Whereas the FDA in effect ensures that Americans are properly informed about caffeine in all caffeinated food and beverages, abysmally, in a major developing country like Nigeria, the NAFDAC is yet to promulgate such laws. Propagated disclosure of the quantity of caffeine in foods enacted by policy makers should warrant the labeling of the exact metric amount of caffeine contained in the products (e.g. "X mg of caffeine"), displayed prominently on the information panel [15]. The caffeine disclosure should be adjacent to the ingredient statement because that is where most consumers expect to find content information, this will to a great extent curtail the mishaps prompted by indirect caffeine consumption in the society. In Nigeria, the use of caffeinated food/drinks has been on the increase because the high caffeine consumption tends to be synonymous to alleviating the environmental stressors linked to the current restiveness in this part of the globe. Unfortunately there is paucity of scientific data on this in our environment, which necessitated this study.

MATERIALS AND METHOD

Study setting:

The study was conducted in Port Harcourt metropolis. Port Harcourt is a major cosmopolitan capital city of Rivers State in the South-southern geopolitical zone within Nigeria. Port Harcourt metropolitan area encompasses Port Harcourt City (PALGA) and Obio-Akpor (OBALGA) Local Government Areas. It is one of the major cities of the Niger Delta Region with diversified industrial activities related to oil and gas exploration, which attract agglomeration of emigrants.

Study Design:

The study is a questionnaire and diary-based survey of 120 persons from a cohort of clinic attendees of the three primary, secondary, and tertiary hospitals located in Port Harcourt, Rivers State, Nigeria. The primary analysis was to determine the effects caffeinated food/drinks have on quality of sleep, while quantifying total sleep time and time spent in bed, facilitated by respondents' sleep logs configuration. Daily intake of caffeine rich food/drinks, alcohol, tobacco consumption, use of sedative-hypnotics and daytime somnolence were assessed by the questionnaire [14]. Respondents' bed mates, spouses, companions and cohabiters were interviewed during the study, because patients sometimes may be oblivious of their sleep problems and outcome of intervention; in view of that, interviewing a significant other or bed partner familiar with the person's snoozing/sleeping habits, complaints, or breathing moods, movements, and snoring yield better results. The study investigated records of admission, observational technique

and face to face interview on the outcome of treatments options, comparing the short-term efficacy of pharmacotherapy and behavioral therapy in primary insomnia. Our intent was to identify a broad range of conditions that present primary insomnia as their chief complaints, and to rule out or rule in some causes of primary insomnia, that were consistent with current definitions and treatments options considered most effective for insomnia. The investigation was conducted from June 2012 to June 2013.

The study utilized a four stage data collection design. First the principal investigators (PI) examined respondents' lifestyle assessment, focusing on their personal life style and habits as they affect health. The goals of lifestyle assessment tools are to provide: a) The opportunity for clients to assess the impact of their present lifestyle on their health. b) A basis for decisions related to desired behavior and lifestyle changes. Secondly, activities of daily living (ADL), covering items like self-care activities; bathing, grooming, dressing, eating, toileting, and bowel and bladder care was obtained. Thirdly, Health Style Self test Questionnaire was used to elicit eating and drinking habits. In the fourth stage, the Dietary Recall/Risk Factor Questionnaire was used because heavy caffeinated food/drink consumption became prominent in the third stage. Respondents' were divided into two groups; a 48 hour dietary recall of caffeine rich food/drinks, alcohol, tobacco consumption, use of sedative-hypnotics and daytime somnolence were assessed by the questionnaire. 2.3 48 hour Dietary Recall/Risk Factor Potential Questionnaire

Frequency of Consumption of Some Caffeinated Foods/Beverages 3 to 4 times daily:

Variable	No/% Intervention Group N= 60	No/% Control Group N= 60
Caffeinated soda Coke/Pepsi	7(11.66%)	6(10.00%)
Dark Hard chocolate	5(8.33%)	6(10.00%)
Tea/chocolate drinks	16(16.66%)	11(18.33%)
Coffee ice cream	3(5.00%)	4(6.66%)
Lacasara , Power Horse/ Soft drink/Jolt Cola	10(16.66%)	10(16.66%)
Caffeinated Cold medications (OTC)	4(6.66%)	(6.66%)
Use of alcohol and tobacco	5(8.33%)	4(6.66%)
Decaffeinated soda soft drinks	6(10.00%)	6(10.00%)
Less than 3-5 times caffeine intake	4(6.66%)	4(6.66%)
Kola nut (Cola acuminata)	6(10.00%)	5(8.33%)
TOTAL	60(100%)	60(100%)

Scoring Interpretations:

Respondents receive one point for each positive answer. One to Three " yes" answers indicate a potential for high caffeine consumption and five to six "yes" answers indicate a pronounced dependence.

Criteria for Selection

- Respondents who admitted to heavy consumption of caffeinated food/drinks (3-4 times daily), were chosen as subjects 60(50%).
- Respondents who admitted to consumption of caffeinated food/drinks two to four times a day (2-4 times daily), were chosen as controls 60(50%) in accordance with the exclusion/inclusion criteria. major therapeutic use.

All respondents received treatments regimen considered therapeutic for insomnia, which is Benzodiazepines and benzodiazepine receptor agonists (for example zopiclone, zolpidem or zaleplon) etc. A total number of 60(50%) respondents were selected based on the inclusion criteria as they admitted to heavy consumption of caffeinated food/drinks three to four times a day (3-4 times daily). They were encouraged to reduce use of caffeinated food/drinks as much as they could and were counseled on sleep behavioral therapy and sleep hygiene. The respondents were weaned from medication on a gradual process before commencement of the investigation. This formed the intervention group; the remaining 60 were those who admitted to consumption of caffeinated food/drinks two to four times a day (2-4 times daily). They were encouraged to continue with which ever caffeinated food/drink they usually consume, while they continued on their use of hypnotics, and/or any other form of sedatives they were receiving. These formed the control group 60(50%) in accordance with the exclusion/inclusion criteria.

Ethical Approval and Consent

Prior to commencement of study, standardized description of goals and study, data uses and protection and rights of respondents were provided both in written and verbal form to all pre-designated respondents before obtaining informed consent for participating in the survey. Respondents were free to decline participation, not respond to any question or opt out completely at any given time during the interview without reprimands. Consents were sought from the institutions and approved by their ethical committee.

RESULTS AND DISCUSSION:

Four hundred and twenty persons were screened during the study period from the three healthcare institutions; one hundred and twenty subjects 120(30.00%) summarized inthe study outcomes met the inclusion criteria. Patients with medical problems two hundred and eighty 280(70.00%), that can cause insomnia such as cerebral malaria, arthritis, endocrine, cardiovascular, pulmonary, gastrointestinal, psychiatric symptoms that might reveal mental illness, especially depression, or emotional factors, for instance, grief and other disorders were excluded from the study to prevent flaws and biases in the result [16] [Table 1]

Table 1 Criteria for Inclusion and Exclusion of Patients Screened Based on Medical Problems N=420

Medical Problems	# Included %	# Excluded %
Individuals that have medical problems that can cause insomnia such as cerebral malaria, arthritis, endocrine, cardiovascular, pulmonary, gastrointestinal, psychiatric symptoms that might reveal mental illness, especially depression, or emotional factors and grieving factors	0(0%)	280 (70%)
Individual without medical problems other than hypertension and primary insomnia	120(30%)	0(0%)

Patients with medical problems two hundred and eighty 280(70.00%), that can cause insomnia such as cerebral malaria, arthritis, endocrine, cardiovascular, pulmonary, gastrointestinal, psychiatric symptoms that might reveal mental illness, especially depression, or emotional factors, for instance, grief and other disorders were excluded from the study to prevent flaws and biases in the result

Only cases thatreported sleep latency and continuity measures that were basedon mean values before and after treatment derived from prospective andself-report sleep diaries were included. A patient-recorded sleep diary was utilized and questionnaires on well-being and sleep habits provided information that was diagnostically helpful. Diary data is one of the most accurate patient reported information that is a measurement strategy most frequently used, which represents the primary means of assessing patients in practice [1 & 17]. A total number of 76 males participated in the study, 37 from the intervention group and 39 from control group. Female respondents were 44; 21 came from the study group while 23 came from the control group. Ages range from 30 years through 65 years for both males and females. Socio-Demographic characteristics are summarized in [Table I A to E].

Table I (A): Socio-Demographic Characteristics of Respondents

Ages	No/% Subjects	No/% Control
(Years)	N=60	N=60
30-35years	5(8.33%)	7(11.66%)
36-41 years	10(16.66%)	12(20.00%)
42- 47 years	18(30.00%)	14(23.33%)
48- 53 years	11(18.33%)	10(16.66%)
54- 59 years	9(15.00%)	11(18.33%)
60- 65 years	7(11.66%)	6(10.00%)
Total	60(100%)	60(100%)

There is a significant difference in the use of caffeinated substances among the young and the middle aged adults. The younger and the older respondents tended to consume less.

Table I (B): Gender of Respondents

Variable	No/% Subjects N=60	No/% Control N=60
Male	39(65.00%)	37(61.66%)
Female	21(35.00%)	23(38.33%)
Total	60(100%)	60(100%)

There is a noteworthy difference in the gender variables as males were more likely to use caffeinated products than the females.

Table I (C): Educational Status of Respondents

Variables	No/% Subjects N=60	No/% Control N=60
None	10(16.66%)	17(28.33%)
Primary/Elementary	9(15.00%)	7(11.66%)
Secondary/High School	18(30.00%)	16(26.66%)
Tertiary	23(38.33%)	20(33.33%)
Total	60(100%)	60(100%)

Those of higher academic and social status were more likely to consume greater amount of caffeinated products due to the immense secular pressure and societal demands.

Table I (D): Marital Status Of Respondents

Variables	No/% Subjects N=60	No/% Control N=60
Single	7(11.66%)	9(15.00%)
Married	41(68.33%)	39(65.00%)
Divorced	2 (3.33%)	5(8.33%)
Widowed	10(16.66%)	7(11.66%)
Total	60(100%)	60(100%)

Table I (E): Occupational Status of Respondents

Variables	No/% Subjects N=60	No/% Control N=60
Trader	15(25.00%)	11(18.33%)
Business Contractors	17(28.33%)	15(25.00%)
Unemployed	5(8.33%)	14(23.33%)
Employed/Civil Servants	23 (38.33%)	20(33.33%)
Total	60(100%)	60(100%)

Meaningfully employed respondents were more likely to use more caffeinated substances to stay alert to complete their tasks and assigned responsibilities. All cases acknowledged to excessive consumption of caffeinated beverages/food drinks on a daily basis as a 48 hour dietary recall confirmed same. Use of alcohol and tobacco was minimal in all groups as is depicted in Table II.

Table II: 48 Hours Dietary Recall/ Risk Factor Potential Questionnaire Frequency Of Caffeinated Foods/Drinks Consumed 3-4 Times Daily

Variable	Intervention Group N= 60	Control Group N= 60
Caffeinated soda Coke/Pepsi	7(11.66%)	6(10.00%)
Dark Hard chocolate	5(8.33%)	6(10.00%)

Tea/chocolate drinks	16(16.66%)	11(18.33%)
Coffee ice cream	3(5.00%)	4(6.66%)
Lacasara, Power Horse/ Soft drink/Jolt Cola	10(16.66%)	10(16.66%)
Caffeinated Cold medications (OTC)	4(6.66%)	(6.66%)
Use of alcohol and tobacco	5(8.33%)	4(6.66%)
Decaffeinated soda soft drinks	6(10.00%)	6(10.00%)
Less than 3-5 times caffeine intake	4(6.66%)	4(6.66%)
Kola nut (Cola acuminata)	6(10.00%)	5(8.33%)
TOTAL	60(100%)	60(100%)

Consuming caffeinated food or drink prior to sleep may result in increased periods of wakefulness during the night [17], as was noted in the respondents. Some refer to this as "caffeine insomnia," which is increased wakefulness during times when a person would ordinarily be sleeping [18], as was observed from the 48 hour dietary recall of caffeine rich food/drinks [Table II]. Sleep experts and health care practitioners can be vital tools to help identify the underlying causes of sleeplessness such as excessive use of caffeine and many other substances that alter sleep wake circle. This will facilitate getting the patient profile on the pathway to a regular, restful sleep cycle.

Caffeine as a cause of primary insomnia cannot be overemphasized. Whereas most primary care physicians take closer look at patients that drink caffeinated drinks when diagnosing insomnia and sleep related disorders, some psychiatrist may not. Recent studies published in Advances in Psychiatric Treatment, failure to identify caffeine as the culprit in many psychiatric problems may result in false diagnosis of anxiety, depression and related disorders [19 & 20]. Researchers believe that patients who drink too much caffeine may exhibit symptoms that are similar to psychiatric disorders, for this reason how much caffeine a person drinks should be a routine question psychiatrists and doctors should ask [21].

Sleep latency, quality and duration, etc are shown in [Tables III A-C]. The effects of high consumption of caffeinated food/drinks, pharmacotherapy and behavioral therapy for primary insomnia was evaluated, utilizing a sustained analysis of outcome by using respondents' subjective sleep log diaries. Diary data were chosen because this measurement strategy is most frequently used and because it represents the primary means of assessing patients in practice [1 & 22]. Previous studies on caffeine and sleep proposed that caffeine causes people to stay awake more than it interrupts sleep [23], in other words caffeinated food/drink is more likely to keep someone awake than impact on the time the person spends in any of the sleep stages. This investigation essentially yielded significant results employing the behavioral therapy that was

utilized. In this investigation we hypothesized and evaluated the effects of caffeine reduction on three sleep continuity variables: sleep latency, total sleep time, and number of awakenings. Furthermore, we presented information from the literature on the outcome of the two treatments on subjective sleep quality and wake time after sleep onset. Other studies support the relationship indicated above [24], for example sleep latency yielded impressive results from the intervention group, due to cessation of caffeinated food/drink [Tables III A-C].

Table III A: Sleep continuity log prior to study

Variables	Subjects	Control
Sleep latency	2 to 3 hours	2 to 3 hours
Number of awakenings.	2 to 3 times/nightly	2 to 3 times/nightly
Wake time after sleep onset	45 minutes	45 minutes
Sleep quality	Dreary with medication	Dreary with medication
Sleep Duration	4 to5 hours	4 to 5 hours

Table III B: Sleep Continuity Log Midway Into Session (3 To 6 Months Into Study)

Variables	Subjects	Control
Sleep latency	45 minutes to 1 hour	2 to 2.5 hours
Number of awakenings.	1 to 2 times nightly	2 to 3 times nightly
Wake time after sleep onset	3 to 4 hours	45 minutes to 1 hours
Sleep quality	Fair without medication	No change with medication
Sleep Duration	5 to 7 hours	5 to 5. 5 hours

Table III C: Sleep Continuity Log At End Of Session (7 Months And After)

Variables	Subjects	Control
Sleep latency	30 minutes to 1 hour	1 to 2.5 hours
Number of awakening times	once nightly	2-3 times
Wake time after sleep onset	4 hours	55 minutes to 1.5 hours
Sleep quality	Improved without medication	Mediocre with medication
Sleep Duration	6 to 8 hours	5 to 6 hours

Caffeine functions as a central nervous system (CNS) stimulant in humans, with a temporarily effect of warding off drowsiness and restoring alertness. Caffeine containing beverages such as coffee, tea, soft drinks and energy drinks enjoy great popularity. Common ingredient found in soft drinks such as cola are originally prepared from kola nuts (Cola acuminata), which causes insomnia. Insomnia is a common complaint that usually results from stress or the use of certain substances or drugs and may be managed by reduced caffeine use, behavioral means, and it often responds well to changes in lifestyle modification in the type and the amount of food consumption and, if necessary, short term use of pharmacologic treatment. Brittain and Pranker, (2011), hypothesized postulated that soft drinks typically contain about 10 to 50 milligrams of caffeine per serving [25 & 31], and conversely, energy drinks such as Red Bull contain as much as 80 milligrams of caffeine per serving [Appendix A: Box 1-1] [31]. The caffeine contents in these

drinks are either derived from the ingredients used or is an additive originating from the product of decaffeination or from chemical synthesis that has the tendency of affecting peoples' sleep wake circle, because it readily crosses the blood-brain barrier [26]. Beverages like alcohol, nicotine, and antidepressants and caffeine readily crosses the blood–barrier. Once in the brain, the principal mode of action is as an antagonist of adenosine receptors found in the brain which affects all systems of the body [27], as was noted from this study. The reduction of caffeinated food/drinks resulted in improved vital signs from the intervention group as is illustrated in the non invasive anthropometric parameters of respondents, prior to the study, midway to the study and at the end of the study [Table IV (B and C)], compared to vital signs reading prior to the survey (Table IV A). Our investigation is in corroboration with the study carried out by the American Psychiatric Association which suggested that minimal use of caffeinated food/drinks results in enhanced vital signs as was observed from the non- anthropometric parametric changes within the study group: prior to, midway in, and at the end of our investigation [Tables IV (A) to (C)].

Table IV (A): Non Invasive Anthropometric Parameters Of Respondents Prior To Survey

Blood Pressure	Intervention group N=60	Control N=60
130/55-135/60	5(8.33%)	6(10.00%)
136/61-141/63	3(5.00%)	4(6.66%)
142/64-147/67	7(11.66%)	6(10.00%)
149/68-154/71	5(8.33%)	9(15.00%)
155/72-160/75	9(15.00%)	7(11.66%)
161/76-166/79	8(13.33%)	7(11.66%)
167/80-172/83	6(10.00%)	4(6.66%)
173/85-178/88	4(6.66%)	4(6.66%)
179/89-184/92	3(5.00%)	3(5.00%)
185/93-190/96	5(8.33%)	4(6.66%)
191/97-196/99	5(8.33%)	6(10.00%)
Total	60(100%)	60(100%)

Table IV (B): Noninvasive Anthropometric Parameters of Respondents Midway Into Study 3-6 Months In Study

Blood Pressure	Intervention group N=60	Control N=60
130/55-135/60	9(15.00%)	4(6.66%)
136/61-141/63	7(11.66%)	3(5.00%)
142/64-147/67	12(20.00%)	7(11.66%)
149/68-154/71	6(10.00%)	6 (10.00%)
155/72-160/75	8(13.13%)	7(11.66%)
161/76-166/79	6(10.00%)	7(11.66%)
167/80-172/83	2(3.33%)	5(8.33%)
173/85-178/88	2(3.33%)	5(8.33%)
179/89-184/92	2(3.33%)	4(6.66%)

185/93-190/96	3(5.00%)	5(8.33%)
191/97-196/99	3(5.00%)	7(11.66%)
Total	60(100%)	60(100%)

Table IV (C): Non Invasive Anthropometric Parameters of Respondents at end of Study 7 Months and after

Blood Pressure	Intervention group N=60	Control N=60
130/55-135/60	15(25.00%)	5(8.33%)
136/61-141/63	17(28.33%)	4(6.67%
142/64-147/67	10(16.66%)	7(11.67%)
149/68-154/71	9(15.00%)	6(10.00%)
155/72-160/75	4(6.66%)	5(8.33%)
161/76-166/79	2(3.33%)	6(10.00%)
167/80-172/83	0(0.00%)	5(8.33%)
173/85-178/88	1(1.66%)	7(11.67%)
179/89-184/92	1(1.6%)	9(15.00%)
185/93-190/96	1(1.66%)	3(5.00%)
191/97-196/99	0(0.00%)	3(5.00%)
Total	60(100%)	60(100%)

The differences in the methodology used in both studies may have accounted for the difference in their prevalence rate. Our investigation utilized behavioral intervention, which focused on modifying contingencies thought to maintain insomnia [28], (see the section for intervention). Effective treatment modality peaked after eight to twelve weeks into session and required substantial patient motivation. The most efficacious components are considered to be stimulus control and sleep restriction [29]. Stimulus control comes in the way of reducing the caffeinated beverages and food that is packed in the edible commodities that consumers are naively exposed to. Sleep hygiene instructions and cognitive therapy was included as well. Advantages of behavior therapy are minimal side effects and sustained improvement. Sleep latency which is the amount of time it takes one to fall asleep is depicted in the sleep continuity log, prior to the study, midway to the study and at the end of the study [Table III A to C]; this resulted in enhanced outcome from the study group and is in conjunction to previous studies carried out in the United States of America [1]

Whereas sleep diaries provides idiosyncratic evaluation of sleep, subjective complaints are necessary and sufficient to make the diagnosis of primary insomnia. [Tables III A to C]. The subjective measures of sleep latency, number of awakenings, and wake time after sleep onset, total sleep time, and sleep quality before and after treatment were impressive on the intervention group. There were no differences in magnitude from the pharmacological group although they maintained the same sleep continuum as in the beginning of the study. Behavioral therapy resulted in a greater reduction in sleep latency than pharmacotherapy as per the sleep

dairy recorded by respondents.

Juxtaposing pharmacological and behavioral treatment in clinical practice, sleep diaries are by far the most consistently used measure of sleep in the studies [30], as was employed in this study. This is in corroboration with previous studies, which support the correlation between caffeine consumption and insomnia, although, it should be noted, however, that patients with insomnia routinely overe stimate sleep latency as well as wake time after sleep onset and underestimate total sleep time compared with their sleep/wake log measurement. A known truth is that people who have primary insomnia tend to worry about getting enough sleep, therefore the more they try to sleep, the greater the sense of frustration, anxiety and distress, which potentate more sleeping difficulties [29 & 30] . The limitation of this study is that it is a few healthcare facilities based study, and therefore may not be a true reflection of the situation in the community.

APPENDIX A: BOX I-I

Product	**Serving per size**	**Caffeine per serving**	**Caffeine liter**
Caffeine Tablets *(R/S)	1 tablet	100	-
Caffeine Tablets *(X/S)	1 tablet	200	-
Excedrin Tablet	1 tablet	65	-
Chocolate Dark	1 bar (43 g; 1.5 oz)	31	-
Chocolate Milk Bar	1 bar (43 g; 1.5 oz)	10	-
Coffee brewed	207 ml (7 U.S. fl oz)	80- 135	386-652
Coffee drip	207 ml (7 U.S. fl oz)	115- 175	555-845
Coffee decaffeinated	207 ml (7 U.S. fl oz)	5	24
Coffee, espresso	44-60ml(1.5-2 U.S. fl oz)	100	1691-2254
Coffee, starbucks	(Tall 12 U.S. fl oz)	240	650- 700
Tea leaf or bag	177ml (6 U.S. fl oz)	50	281
Tea green	177ml (6 U.S. fl oz)	30	169
Soft drink, Coca Cola	355 ml (12 U.S. fl oz)	34	96
Soft drink, Mountain Dew	355 ml (12 U.S. fl oz)	54.5	154
Drink/Jolt Cola/**Lacasara**	695 ml (23.5 U.S. fl oz)	280	402
Red Bull/ Power Horse	250ml (8.2 U.S. fl oz)	80	320
Monster Energy	473 ml (16 U.S. fl oz)	160	338
Wired X344	473 ml (16 U.S. fl oz)	344	727
Foosh Energy Mints	1 mint	100	_
Buzz Bite	chew 100	-	-
Buckfast Tonic Wine	750 ml (25.4 U.S. fl oz)	281	375

APPENDIX A: Box I-I

Source: Brittain and Prankerd. Profiles of Drug Substances, Excipients and Related Methodology 2007; 33. Critical Compilation of Pka Values for Pharmaceutical Substances. Academic Press.

Peters, Josef M. 'Factors Affecting Caffeine Toxicity: A Review of Literature'. J Clin Pharm & J New Drugs 1967; 7: 131–141.

CONCLUSION:

With these findings we deduce that caffeine abuse and its adverse effects are more prevalent than we may imagine since caffeine triggers insomnia in a gradual process. Inadequate sleep can result in adverse personal, medical, or psychiatric sequelae and increased risk for accidents. Caffeine's effect on our body, our nervous system, our mind and our psychology is no illusion. It is a potent drug. These facts should be brought to the attention of the medical/healthcare community as well as the public awareness on the adverse effects of excessive caffeine consumption and the possible interactions between ourselves and our environment. This article deserves the attention of the NAFDAC in Nigeria, for various reasons. The authors urge NAFDAC to ensure that a routine quantitative labeling of caffeine content in food and beverages, be made a material factor for consumers.

INTERVENTION:

The American Sleep Disorders Association suggests one or more of the following practices might help: In essence behavioral strategies for better sleep are deceptively simple, and that is one reason why many people don't believe they can make a difference. Basically, stimulus control is one of ''the most effective methods for sleep remedy. The following tips can help improve sleep. This is called sleep hygiene.

- If you visit your doctor for a routine health exam, or because you have concerns about insomnia, make sure you consider your caffeine intake.
- Talk with your doctor to establish dietary guidelines that take into account your overall health and sleeping habit.
- A 100% abstinence from caffeine will improve or cure a large percentage of insomnia without sleeping pills.
- It's better not to smoke at all, but if you can't help but to smoke, avoid smoking at bedtime.
- Caffeine and nicotine are both stimulants. Even if they don't interfere with falling asleep, they may trigger awakenings later.
- Drinking water late in the night can keep one awake due to frequent urination.
- Adding light-proof blinds to your bedroom to keep it dark and making sure the bed and room temperatures are comfortable, do not watch television, eat or read in bed.
- Eat regular meals, don't go to bed hungry and limit beverages, particularly alcohol and caffeinated drinks, around bedtime.
- Do not go to bed until you are sleepy and go to bed at the same time every night

- Get up at the same time every day, and don't nap during the day.
- If you are unable to sleep, get out of bed after 15 minutes and do something relaxing, but avoid stimulating activities and thoughts. (going to another room may help reduce your anxiety about falling asleep)
- Exercise early in the day and keep comfortable sleeping conditions.
- Practice evening relaxation routines such as muscle relaxation. Establish relaxing pre-sleep rituals, such as a warm bath, light bedtime snack, reading, or watching television.
- Remove the anxiety that comes with trying to sleep by reassuring yourself that you will sleep or by distracting yourself.
- Finally patients were encouraged not try too hard to fall asleep, and turn the clock around so they can't see it. Watching time pass is one of the worst things to do when one is trying to fall asleep. It may be hard to believe, but studies show that these simple steps really do make a meaningful difference for people with sleep problems. These interventions are based on the notion that thoughts and behaviors can "overexcite" the central nervous system and deregulate the sleep wake cycles, resulting in chronic insomnia [31].

AUTHORS CONTRIBUTION:

Stanley PC, Aburoma HLS, Ukaigwe PC and George AN, implemented the study design, involved in the acquisition of data and data analysis over the past 12 months. Aburoma HLS drafted the original text. All authors revised the manuscript, read and approved the final manuscript.

ACKNOWLEDGEMENT:

The authors are very grateful to the McCarrib Aburoma Universal Health Resources for financially and logistically supporting the project.

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