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Predictors of stimulants use among physicians in a Nigerian tertiary health institution in Sokoto, Northwest Nigeria

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Studies suggest that prevalence rates of stimulants use and abuse among healthcare professionals is similar to rates in the general population. Majority of the studies on stimulants use carried out in Nigeria mainly focused on students of secondary and tertiary institutions, thus, there is the need to conduct similar study among physicians in Nigeria. This study aimed to assess the pattern and predictors of the use of stimulants among physicians in Usmanu Danfodiyo University Teaching Hospital (UDUTH), Sokoto, North-west Nigeria. A descriptive cross sectional study was conducted among physicians of all ranks in UDUTH, Sokoto. Stratified sampling technique was used to select 107 participants and a set of semi-structured self-administered questionnaires were used to obtain data from the participants. Data were analyzed using IBM SPSS version 20. Prevalence of current stimulant use was 59% and majority (83%) of the respondents take coffee, 54.5% take kola nut, 35.1% take caffeinated energy drinks and only 2% of the respondents take cigarette. Among the 87.9% that have ever used stimulants, 41% (n=43) have stopped. Majority of them (70.97%) take stimulants only once in a day and none of them take any stimulant via parenteral route. Rank of the respondent was the strongest predictor of current stimulant use (OR= 3.741, p=0.017, 95% CI=1.270-11.021). The prevalence of stimulants use among physicians is quite high. Coffee is the most consumed stimulant and rank of the physicians is the strongest predictor of current stimulants use. There is also need to assess the effect of stimulants consumption among physicians considering the high prevalence of its consumption among them.

Key words: Predictors, stimulants, physicians, Sokoto, Nigeria.

INTRODUCTION

Stimulants, also called psychostimulants are substances or drugs that act on the central nervous system (CNS) to speed up both physical and mental activities of the body (Alan, 2003). They can also be defined as a group of drugs that stimulate the central nervous system activity, thereby, producing euphoria, a sense of wellbeing, wakefulness and alertness (Psychostimulant Information for Health Care Workers, 2006). Examples include:

caffeine, energy drinks containing caffeine, theophylline (tea), nicotine (often found in kola-nut and tobacco), amphetamine, alcohol, marijuana etc (Psychostimulant Information for Health Care Workers, 2006).

Over the past few years, the consumption of energy drinks (containing stimulants) have increased greatly (Woolsey et al., 2010). Stimulants use and abuse has a universal phenomenon that extends across socioeconomic, cultural, religious and ethnic boundaries. Healthcare professionals are said to be at risk of substance abuse especially stimulants (Psychostimulant Information for Health Care Workers, 2006). Studies suggests that prevalence rates of stimulants use and abuse among healthcare professions is similar to rates in the general population, although healthcare workers have higher rates of abuse with benzodiazepines and opiates (Marie, 2007). Such specialties as anesthesia, emergency medicine and psychiatry have higher rates of drug abuse. Some reasons suggested for this higher rate include job stress, the baseline personalities of providers in these specialties, and easy access to drugs (Marie, 2007). Many health workers continue to use stimulants because they want a pleasurable change in their state of mind, stay awake, study for long hours, elevate mood, increase confidence feeling, etc.

During the last decade, most parts of the world experienced a growing interest in problems associated with the non-medical use of substances, specifically stimulants. This heightened awareness has corresponded to a real growth in the extent, diversity and social impact of the use of stimulants in many societies (Adelekan et al., 2000). Recently, consumption of stimulants like Amphetamine (commonly known as speed), cocaine, cola-nuts, tobacco and caffeine has risen drastically in Nigeria (National Drug Law Enforcement Agency (NDLEA), 2000). Caffeine is the most consumed socially acceptable stimulant, with approximately 90% of the population who consume it daily in the industrialized countries (Favrod-Coune and Broers, 2010). Nicotine can be considered the most used legal stimulant, with 25% of the population who use it daily in Western Europe, and 17.5% in the United States of America. For nicotine, the percentages are even higher in Eastern Europe and South America, and with a clear male predominance (WHO, 2008).

Tobacco (together with alcohol) is the most abused substance in the United States, and there are over 60 million users of tobacco including both cigarette and smokeless forms (Fischer and Bamberg, 2013). Research has shown that people who smoke cigarettes are seven times more likely to abuse other drugs (Substance Abuse and Mental Health Services Administration (SAMHSA), 1998). In addition, there is a strong correlation between the use of alcohol and nicotine, thus people who abuse one are more are likely to abuse the other (Anthony and Echeagaray, 2000) Because of their legality, the general population may view the addiction potential of alcohol and tobacco as limited (Anthony and Echeagaray, 2000). As the use of stimulants has become a global phenomenon, the pattern of its use however, vary from to country, and even within country it varies from region to region. The WHO World Mental Health Survey Initiative followed over 85,000 people in 17 countries around the world. They found that life-time prevalence of cocaine use varied between 0 and 16%, the lowest being in China, Japan and Nigeria, and the highest being in the USA (Degenhardt et al., 2008). In the UK, the mean caffeine intake from tea, coffee and carbonated beverages were reported to be 3.98 mg per kilogram body mass ($mg.kg^{-1}$ body mass) per day. This equates to an approximate intake of 278 mg per day for a typical 70 kg male (Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment, 1998).

In Africa, a study in Zanzibar (Tanzania) reported painkillers to be the commonest substance used (33.1%), followed by cigarettes (19.7%), alcohol (17.8%), cannabis (14.4%), sedatives (11.5%), heroin (9.1%) and tranquillizers (8.8%). Lifetime use of other substances was low (WHO/UNDCP, 2003). In Nigeria, a study conducted among some undergraduate students revealed that coffee was the most commonly used drug (43.1%), followed by alcohol (25.8%) and marijuana (7.4%) and their use cut across all the faculties. Coffee and alcohol were the two drugs that were used singly (Oshikoya and Alli, 2006). Excessive use of stimulants over long periods of time could lead to physical and psychological dependence and withdrawal symptoms manifest with the use of these substances. These symptoms include irritability, impatience, hostility, anxiety, restlessness and difficulty in concentrating (Ebie, 1998). The use of some stimulants (e.g. amphetamines) could lead to abusive behaviors such as loss of self-control; where the substance gains control over the individual's behavior (Egbochuku, 2002). More deaths and long-term healthcare complications result from the use of tobacco and alcohol than all other illicit substances combined (Fischer and Bamberg, 2013). About 30% of cancer deaths and 90% of chronic obstructive pulmonary disease (COPD) in the US are believed to be as a result of smoking.

The conceptual framework for this study is based on the Social Stress Model of Substance Abuse (SSMSA) (Rhodes and Jason, 1988) which is a model developed to explain parameters that influence drug use. According to

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the model, the likelihood of an individual engaging in drug use is seen as a function of the stress level and the extent to which it is offset by stress modifiers such as social networks and social competencies. Competence here refers to innate or acquired intrapersonal factors which influence a person's decision to use or not use stimulants or other drugs (Rhodes and Jason, 1988). Competence-related attributes assessed both among adolescents and adult populations were shown to have an inverse relationship with drug use behavior (Lindenberg et al., 1998); thus, the higher the competence, the lower the likelihood of using drugs and other stimulants. This model therefore, formed the basis for the conceptual framework of this study; it is hypothesized that higher ranking physicians with longer duration of service are less likely to use stimulants especially the illicit ones, because they have better coping strategies (social competence) than lower ranking physicians.

Misuse of stimulants (including other substances) by healthcare professionals raise a great concern including threats to patient care. A previous study has shown that self-medication is common among physicians (Montgomery et al., 2011). Most of the studies on stimulant use among health workers were conducted in Europe and America and among the studies carried out in Nigeria, majority focused on secondary school students and students of tertiary institutions; this necessitated the need to conduct this study, with the aim of assessing the pattern and predictors of stimulants use (including other substances) among physicians in Usmanu Danfodiyo University Teaching Hospital (UDUTH) Sokoto.

MATERIALS AND METHODS

The study was conducted in Usmanu Danfodiyo University Teaching Hospital, Sokoto between February and May 2015. The hospital being a tertiary institution, provides specialized health care service to Sokoto State and the entire North-Western region of the country. It has a bed capacity of about 850, 24 clinical departments and doctor strength of more than 300, including Professors, Consultants, Resident/Medical Officers and House Officers.

Study population

The study population comprised of physicians working in Usmanu Danfodiyo University Teaching Hospital, Sokoto.

Inclusion criteria

Physicians of all ranks were included in the study to enable comparison between ranks.

Exclusion criteria

Those who have not been in practice for at least six months were excluded from the study.

Study design

It was a descriptive cross sectional study conducted between February and May 2015.

Sample size

The minimum sample size was determined using the formula for estimating sample size in a population less than 10,000

$N_{f=} n/1+ (n/N)$ ([21])

Value of n was calculated using the formula for population >10,000:

$n=Z^2pq/d^2$ ([21])

After adjusting for non-response, a minimum sample size of 107 was obtained.

Sampling technique

The respondents were selected using stratified sampling as follows:

1. Step I: Selection of 5 departments by simple random sampling technique
2. Step II: From each of the selected departments, respondents were stratified according to their ranks (Professors/Consultants, Senior Registrars, Registrars/Medical Officers and House Officers).
3. Step III: From each stratum, proportionate samples were selected using simple random sampling technique.

Instrument/method of data collection

Structured self-administered questionnaires with open and closed options were used to obtain data from the respondents. The content of the questionnaire covered the following: Section A: Bio-data of the study participants and Section B: Pattern of stimulants consumption. The questionnaires were given to all eligible respondents who gave their consent to participate in the research.

Data analysis

The data were entered into the computer and subsequently analyzed with the Statistical Package for Social Science (SPSS) version 20.0 and Microsoft Excel 2007. Continuous variables were presented as mean±SD, while categorical variables were presented as frequencies and percentages. The association between categorical variables and stimulants consumption were determined using Chi square test while predictors of stimulants consumption were determined using logistic regression. Level of statistical significance was set at 5% ($p \leq 0.05$).

Ethical consideration

Ethical approval was obtained from the Ethics Commitee of the Usmanu Danfodiyo University Teaching Hospital, Sokoto and informed consent of the participants was sought. All information were treated with utmost confidentiality.

RESULTS

All the 107 paticipants completed the study representing

Table 1. Socio-demographic profile of respondents.

Variable	Frequency (%)
Age (years)	
20-29	10(9.3)
30-39	67(62.6)
40-49	21(19.6)
50-59	9(8.4)
≥60	0(0)
Sex	
Male	99(92.5)
Female	8(7.5)
Ethnicity	
Hausa-Fulani	63(58.9)
Yoruba	13(12.1)
Igbo	13(12.1)
Others	18(16.8)
Religion	
Islam	79(73.8)
Christianity	28(26.2)
Others	0(0.0)
Marital status	
Single	14(13.1)
Married	93(86.9)
Rank	
H/O	18(16.8)
Registrar	32(29.9)
S/R	29(27.1)
Consultant	24(22.4)
Professor	4(3.7)
Department	
Medicine	25(23.4)
Surgery	27(25.2)
O&G	29(27.1)
Radiology	11(10.3)
Comm. Medicine	15(14.0)
Years of practice	
<1	0(0)
1-5	39(36.4)
6-10	39(36.4)
11-15	11(10.3)
16-20	9(8.4)
>20	9(8.4)
Total	107(100)

O&G-Obstetrics and Gynecology, HO- House Officer, SR- Senior Registrar.

100% response rate. The mean age of the respondents was 37 ± 7 years, with close to two-third of them aged between 30 and 39 years (62.6%) and majority of them 99 (92.5%) were males. Up to 73.8% of them were below the rank of consultant and majority (62.6%) were from surgery-related department (surgery, radiology and O&G), while 37.4% were from medicine-related department (medicine and community medicine). None of the respondents have practiced for more than 30 years. (Table 1).

Sixty-two of the respondents (59%) were current users of various types of stimulants and 87.1% of them have been using it for more than five years. Among the 87.9% that have ever used stimulants, 41% (N=43) have stopped and most of them (71.9%) stopped within the last five years preceding the study. Most of the respondents (73.8%) who were current users only used it while at work and majority of them (70.97%) used it once a day. Regarding the method of consumption of stimulants, all the respondents consumed the stimulants orally, and in addition, 1.6% of them consumed it via inhalation and none of them used through parenteral route (Figure 1 and Table 2).

Regarding the types of stimulants consumed, 83% of the respondents took coffee, 54.5% took cola nut, 35.1% took energy drinks, 15% took NSAIDS with caffeine. Only 2% of the respondents took cigarette, whereas none of them took cannabis or Amphetamine (Figure 2). Among the current users of stimulants, about 55% were taking it in order to stay alert, 50% to stay awake, 41.9% for pleasure, 37.1% to cope with stress, whereas for 11.3% of them, it was to increase their efficiency at work (Figure 3).

In Table 3, factors found to be significantly associated with stimulants consumption were marital status (p=0.03) and rank of respondents (p=0.007). Other factors such as age of respondents, religion, ethnicity and duration of work hours per day were not significantly associated with current stimulants consumption (p>0.05).

On logistic regression analysis, rank of respondents was the only predictor of current stimulants consumption among the respondents (OR=3.741, p= 0.017, 95% CI=1.270-11.021) (Table 4).

DISCUSSION

Physicians, like anyone else are susceptible to stimulant use (Dumitrascu et al., 2014) which may be due to the nature of their work. Despite this, there have been little or no studies on stimulants use by physicians in Nigeria. During the late 1970s and early 1980s, numerous clinicians and researchers called for an empirical study on the pattern of substance use among health care professionals (Matthew et al., 2004).

Most of the respondents in this study were between 30 and 39 years (62.6%), with a mean age of 37±7 years and majority of them (92.5%) were males. This mean age is lower than what was reported in a study conducted by

Table 2. Pattern of current stimulants use among the respondents.

Variable	Frequency (%)
For how long have you been using stimulants? (years)	
<1	0(0.0)
1-5	8(12.9)
>5	54(87.1)
Total	62(100)
Have you ever used stimulant?	
Yes	94(87.9)
No	13(12.1)
Total	107(100)
Duration of cessation (years)	
<1	0(0.0)
1-5	23(71.9)
>5	9(28.1)
Total	32(100)
Have you ever used stimulants and stopped, why?	
Due to side effects	9(28.1)
Due to fear of side effect	7(21.9)
Because I don't need it now	20(62.5)
Do you use any stimulant while at home?	
Yes	27(26.2)
No	76(73.8)
Total	103(100)
How many times do you take stimulant in a day?	
Once	44(70.97)
2-5 times	17(27.4)
>5 times	1(1.6)
Total	62(100)
Mode of consumption of stimulants	
Orally	105(100)
Injection	0(0.0)
Inhalation	2(1.6)

Shaw et al. (2004) in USA where a mean age of 46±9 years was found and 86.3% of the study population was male (Matthew et al., 2004). In this study, 73.8% of the respondents were below the rank of consultant and 62.6% of them were from surgery related specialties (O&G, surgery and radiology), while 37.4% (N=40) of them were from medicine related specialties (medicine and community medicine).

In this study, the prevalence of stimulants consumption was found to be 62% (N=59). Similar prevalence rate (62%) was reported in a research on substance use in the work place (both public and private) in USA (Substance Abuse and Mental Health Services Administration (SAMHSA), 1998). A study conducted among physicians in Switzerland however, reported a very high coffee consumption rate among up to 84% of the physicians (Giesinger et al., 2015). These relatively high prevalence rates may be due to the work stress associated with medical practice especially in this part of the country where doctor to patient ratio is very low.

This study revealed that the most consumed stimulant was coffee (83%), followed by tea (71.3%). This is in line with a similar study on health effects of psychostimulants where coffee was reported to be the most consumed

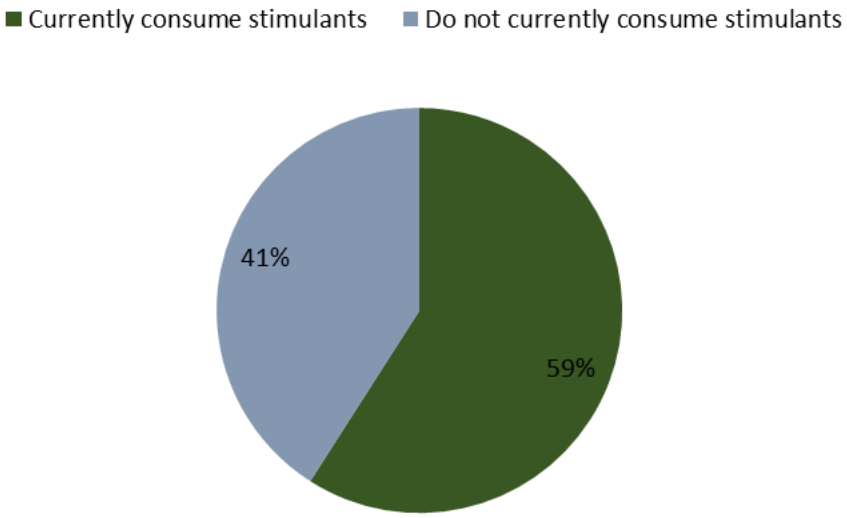

Figure 1. Prevalence of current stimulants use among the respondents.

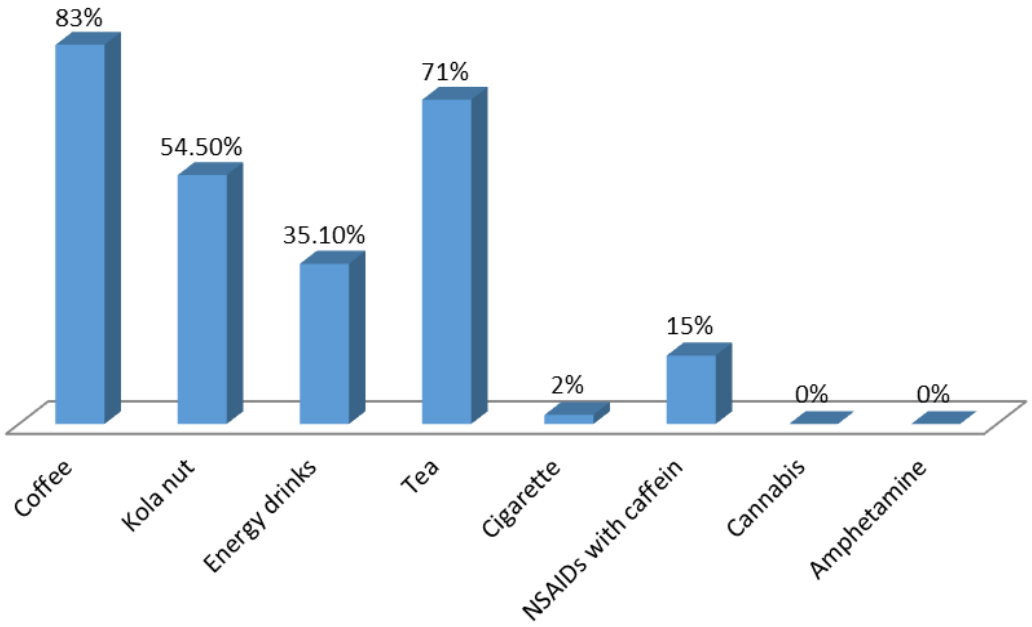

Figure 2. Types of stimulants consumed by respondents (multiple responses considered).

stimulant (71.5%) (Favrod-Coune and Broers, 2010). None of the study participants consume illicit stimulants such as cannabis and amphetamine. In contrast to this finding however, a study conducted in the UK (Jim et al., 2005) reported that Amphetamine was the most consumed stimulant and another study on substance use among health workers in Kenya also showed that other illicit stimulants were consumed by the health workers; 9.3% for cannabis and sedatives, 8.8% for cocaine, 6.4% for amphetamine-like stimulants and 5.4% for hallucinogens (Mokaya et al., 2016). This difference in the types of stimulants consumed between the respondents in the current study and that reported in other studies in different parts of the globe might be due to cultural, social and religious differences; for example, consumption of Amphetamine is considered shameful and socially unacceptable in this part of the country (north-west Nigeria), where up to 58.9% of the respondents were of the Hausa/Fulani tribes.

This study also showed that stimulants are mainly consumed via oral route (100%). This is in line with another study conducted by Teter et al. (2005) where the

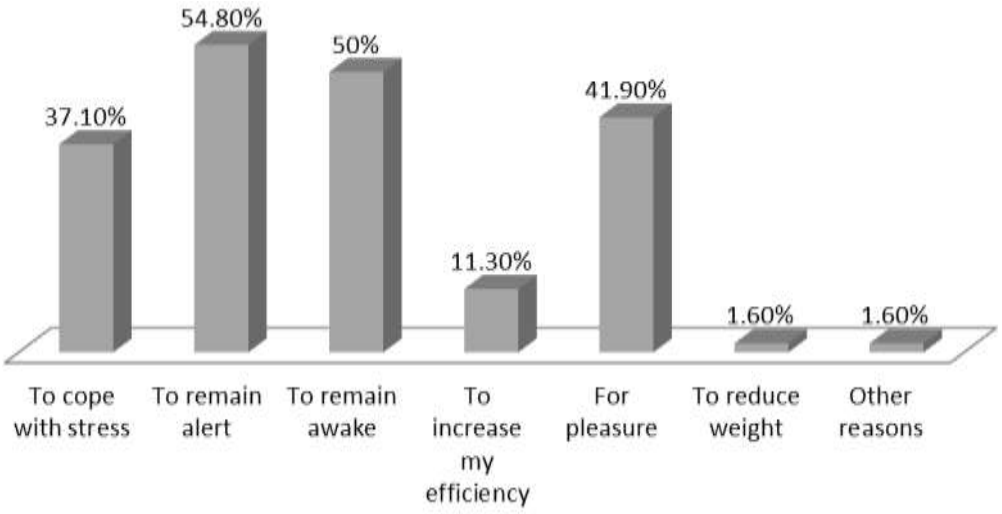

Figure 3. Reasons for consumption of stimulants (multiple responses considered).

main route of administration of stimulants was oral (95.3%). This is probably because of the relative ease of administration via oral route as against parenteral route; moreover, the most widely consumed stimulants are coffee/caffeine containing drinks which are primarily prepared to be consumed orally. Among the various reasons for consuming stimulants, about 54% of the respondents said it was to remain alert while at work. Jimoh and Bakare (2014) in a study conducted among medical students, made a contrasting observation where only 9.5% of the respondents were reported to be consuming energy drinks to remain alert. This difference might be accounted for by the difference in the study populations; this study surveyed physicians, who have higher workloads and specialized tasks that require maximum degree of mental alertness.

It was also found that most physicians (87.1%) have been taking stimulants for more than five years. This suggests that most of the physicians below the rank of consultant could have been using stimulants since they were in medical school. Dumitrascu et al. (2014) also made a similar observation in their study on substance use among physicians and medical students, where some of the physicians said they started substance use as medical students. A study conducted among medical students in the same institution where this study was conducted showed that up to 55.4% of the medical students have used energy drinks at least once and 25.7% were current users of various forms of caffeine containing drinks (Jimoh and Bakare, 2014). These observations further suggest that stimulants consumption is quite high among physicians because a lot of them have initiated its use while in medical school; moreover, most of these stimulants are associated with some forms of addiction, which makes it more difficult for some to stop even after graduation (Favrod-Coune and Broers, 2010). This is similar to a research on substance abuse among healthcare professionals where it was found out that stimulant use among resident doctors is lower than among students (Matthew et al., 2004).

In this study, the major factors associated with stimulants consumption were marital status (P=0.03) and rank of physicians (P=0.007); among the respondents who were married and those up to the rank of consultant, 63 and 81% were current users of stimulants, respectively. When these two factors were subjected to logistic regression analysis, only rank of the respondents was found to be a significant predictor of current stimulants consumption (OR=3.741, p=0.017, 95% CI=1.270-11.021). A study conducted in Switzerland also reported that physicians who are up to the rank of consultants significantly consume more coffee than physicians with lower ranks (Giesinger et al., 2015). This finding is contrary to the theoretical framework of the Social Stress Model of Substance Abuse (SSMSA) (Rhodes and Jason, 1988), which hypothesized that, the higher the competence of individual, the lower the likelihood of using drugs and other stimulants. The reasons why senior physicians consume more coffee than their younger colleagues can only be speculated; the increased coffee intake might help fight age and fatigue to keep up with the younger workforce. Another possibility is that the senior physicians have more purchasing power to buy stimulants such as energy drinks (Power Horse®, Red Bull® etc.) than the younger physicians; moreover, most of the senior physicians have offices where they can have stimulants such as coffee, tea and energy drink drinks readily available.

One of the limitations of this study is that it only looked at stimulants use among physicians; other healthcare professionals especially the nurses were not included in the study even though stimulants use have been also

Table 3. Factors associated with current stimulant consumption.

S/N	Variables	Current stimulants consumption		P-value
		Yes (%)	No. (%)	
	Age (years)			
1	<40	41(53.9)	35(46.1)	X^2=2.96
	≥40	21(72.4)	8(27.6)	P=0.085
	Sex			
2	Male	57(58.8)	40(41.2)	P=1.00(Fisher's Exact)
	Female	5(62.5)	3(37.5)	
	Marital status			
3	Single	4(30.8)	9(69.2)	P=0.03(Fisher's Exact test)
	Married	58(63)	34(37)	
	Tribe			
	Hausa/Fulani	40(64.5)	22(35.5)	X^2=4.172
	Yoruba	4(35.3)	8(66.7)	P=0.250
	Igbo	8(61.5)	5(38.5)	
	Others	10(55.6)	8(44.4)	
	Religion			
4	Islam	50(64.1)	28(35.9)	X^2=3.2
	Christianity	12(44.4)	15(55.6)	P=0.111
	Rank			
5	<Consultant	40(51.3)	38(48.7)	X^2=7.565
	≥Consultant	22(81.5)	5(18.5)	P=0.007
	Specialization			
6	Physician	27(51.9)	25(48.1)	X^2=2.080
	Surgeon	28(66.7)	14(33.3)	P=0.207
	Do you get fatigued at work?			
8	Yes	52(59.1)	36(40.9)	X^2=0.00
	No	10(58.8)	7(41.2)	P=0.98
	Do you frequently fall asleep while at work?			
9	Yes	2(20)	8(80)	P=0.15(Fisher's Exact test)
	No	6(14.6)	35(85.4)	
	Are you highly stressed up at work?			X^2=0.422
10	Yes	35(56.9)	27(43.5)	df=1
	No	27(62.8)	16(37.2)	P=0.516
	Duration of work hours per day			
11	<8	7(63.6)	4(36.4)	P=1.000 (Fischer's Exact test)
	≥8	54(58.1)	39(41.9)	

reported among this group of healthcare professionals. Future studies should consider all cadres of healthcare professionals in order to understand the different factors influencing the use of stimulants among health workers.

Conclusion

Stimulants use among physicians is quite high and coffee is the most frequently consumed stimulant; the strongest

Table 4. Predictors of current stimulants consumption.

Predictors	p-value	OR	95% C.I. for OR	
			Lower	Upper
Marital status				
Single	0.079	3.144	0.875	11.301
Rank				
Below consultant	0.017	3.741	1.270	11.021

predictor of stimulants use among physicians is their rank. The hospital management should conduct a research to assess the effect of stimulants use on the health status and practice of physicians as more than three-quarter of them have been using stimulants for more than five years.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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