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Prevalence of Brain Stimulant Drugs Use and its Physiological Impact Among Students in Tikrit University

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Abstract:
Drugs classified as brain stimulants are molecules that improve some types of cell-to-cell contact and speed up various physiological functions in the body and brain. ***Aim****: of this study is to ascertain how common it is for university students in Tikrit to utilize brain stimulating medicines.* ***Results****: The average age of the 130 students in the study population was 22 years (± 2 years). From different colleges, the gender distribution was 53.1% male and 46.9% female in the fields of dentistry (16.2%), medicine (23.1%), and pharmacy (33.8%). The medicines that were most often taken were Adderall (6.5%), Ritalin (15.1%), Modafinil (16.1%), and caffeine (60.2%). Both males and females showed a significant frequency of drug usage, with men showing a larger percentage (81.2%) than women (60.7%). There was variation in the amount of drugs used; most people used drugs monthly or infrequently. The majority of users thought that using these medicines had an effect on their mental (89.2%) and physical (87.1%) health. The two main sources of non-prescription drugs were pharmacies (34.3%) and friends (24.5%). Medical experts' prescriptions made up 21.6% of the sources. The top three reasons people took brain stimulant medications were to remain awake (27%), increase attention (36%), and reduce peer pressure (10%). Numerous physiological consequences have been documented; the most common ones are fast pulse (34.4%) and rash (15.1%), dilated pupils (14%). Mood swings (18%), sadness (21%), anxiety (39%), and sleeplessness (22%), were the psychological effects of drug usage.* ***Conclusion:*** *significant proportion of the student population at Tikrit University has engaged in the use of brain stimulant drugs. Caffeine emerged as the most commonly used drug, followed by Modafinil, Ritalin, and Adderall, drug use was observed in both genders, with a higher percentage among males, correlation was observed between personal drug use and the influence of peers or relatives who also use these drugs, The reasons for using brain stimulant drugs varied, with the primary motivations being to improve focus, memory, and to stay awake, Users reported both physiological and psychological impacts associated with drug use.*
Key words: *Brain stimulants; cocaine; amphetamines; cognitive enhancers.*

INTRODUCTION

There is variation in the origins, strength, and social acceptability of brain stimulants. Certain substances, like coffee and nicotine, are commonly used and lawful, while others, like cocaine and amphetamines, are illicit and perhaps harmful[1].Brain stimulant medications are a class of compounds that improve some types of cellular communication and amplify a variety of physiological functions across the body and brain[2].These drugs may cause people to experience increased levels of alertness, vigilance, confidence, or wakefulness[2].Drugs that cause increased functional activity in the central nervous system are referred to be stimulants[3]. Stress levels among college students have increased in comparison to previous decades due to increasing internal and external demands to perform consistently well. Their total stress is greatly impacted by these expectations that have been increasing over time[4].The issue of students using cognitive enhancers, sometimes known as "smart drugs," for study purposes has been brought to light by new studies that examine this practice. These medications include both non-prescription medicines like caffeine, cobalamin (vitamin B12), guarana, pyridoxine (vitamin B6), and vinpocetine as well as prescription pharmaceuticals including amphetamine salt combinations, methylphenidate, modafinil, and piracetam [5]. Students primarily use these drugs to increase alertness, focus, or memory in an attempt to improve their academic performance, even though there are dangers of tolerance, dependency, and other somatic consequences such as neurological and cardiovascular problems [6].The abuse of prescription stimulants on college campuses has grown more commonplace worldwide. Students were shown to be more likely to use coffee and energy drinks (41.4%

and 23.6%, respectively, during the course of their lifetime) than prescription stimulants (6.5%) for the goal of enhancing academic performance[7]. The need for cognitive enhancement is growing in society, as seen by the growing number of university faculty members and students using stimulants to improve their learning capacities [8].The nature and frequency of this kind of drug usage, however, might differ greatly depending on social, legal, and regional conditions [9].Particular statistics about the incidence of brain stimulant drug usage are lacking in the context of Iraq, particularly Tikrit University within that framework. Broader research, however, points to a situation of drug abuse among young people and college students in the area [10].The larger context of comprehending and addressing substance abuse in academic settings, which can have significant effects on students' academic performance, mental and physical health, as well as wider societal norms and legal frameworks, is where the significance of researching brain stimulant drug use at Tikrit University lies [11].The incidence of brain stimulant drug usage among students is influenced by a number of factors. One of the main causes is academic pressure, since the rigorous nature of a university education might encourage students to turn to drugs they think would improve their mental faculties and grades [12].Important roles are also played by social factors and the availability of these drugs. For instance, it's been noted that the majority of people who use drugs get them from friends, family, or the internet, suggesting that drugs are accessible and socially accepted, which may lead to overuse [13].Drug-related psychological dependency is impacted by an individual's age and maturity. Addiction is a serious risk factor for young individuals, particularly teens, because of their immature coping skills and the physical and psychological changes they experience [14].Physical and psychological dependency are two different things. Although individuals who take drugs to relieve pain may become physically dependent on them,they seldom become addicted since they have full lives that involve more than simply drug usage [15].The long- term physiological effects of stimulant use on the body and brain include a variety of effects, including marked weight loss, decreased libido, gastrointestinal issues, muscle deterioration, chronic fatigue, cardiovascular problems, respiratory issues, and headaches [16].The legal and social risks linked to stimulant use include the possibility of legal repercussions stemming from some chemicals' prohibition, as well as social condemnation and the risk of developing dependent habits [17]. The problem is made worse by people's ignorance about and disinformation regarding the dangers of using these drugs.The purpose of this study is to ascertain how common it is for Tikrit University students to utilize substances known as brain stimulants.

Materials and Methods: In Tikrit City, a descriptive cross-sectional study design was carried out with a particular focus on students at Tikrit University. The first day of November 2023 marked the start of data collecting, which ended at the end of January 2024. This time frame gave sufficient time for the surveys to be distributed, collected, and analyzed. The method of convenience sampling was used to choose the participants.A systematic questionnaire was created, with sections covering demographic information including age, sex, stage, use of brain stimulant medicines, types of such drugs, attitude toward using them, knowledge of their uses and negative effects, and the physiological repercussions of using them.

Data Management and Analysis:

Microsoft Excel 2020 was used to log and manage data, guaranteeing highest levels of accuracy and privacy. Using IBM SPSS 27, the data were statistically analyzed to provide inferential statistics and measures of frequency distributions that would help the research achieve its goals. P-values below 0.05 were regarded as statistically significant. Categorical variables were analyzed using the Chi-square test.

Ethical Considerations

The Tikrit University College of Medicine's Ethical Committee was consulted before the study got underway. Before distributing the questionnaire, participants must give their verbal agreement, attesting to their understanding of the study's objectives, their legal rights, and the fact that participation is entirely voluntary. At every stage of the study, participant confidentiality was upheld. All answers were kept anonymous, and no personal information was utilized.

RESULTS:

Table 1: Descriptive statistics of study population (N=130)

The study population comprised 130 students, with an average age of 22 years (± 2 years). The gender distribution was relatively balanced, with 46.9% female (61 students) and 53.1% male (69 students). The participants were from various colleges, with Pharmacy (33.8%), Medicine (23.1%), and Dentistry (16.2%) having the highest representations. The stage of study varied, with a higher concentration in the later stages (Fourth and Fifth). Of the participants, 71.5% (93 students) reported having used brain stimulant drugs (Table 1).

Variable		Frequency	Percentage
Age (Mean ± SD) in years		22 ± 2	
Sex	Female	61	46.9%
	Male	69	53.1%
College	Agriculture	1	0.8%
	Dentistry	21	16.2%
	Education	1	0.8%
	Engineering	20	15.4%
	Medicine	30	23.1%
	Nursing	9	6.9%
	Pharmacy	44	33.8%
	Science	4	3.1%
Stage	First	8	6.2%
	Second	24	18.5%
	Third	23	17.7%
	Forth	40	30.8%
	Fifth	32	24.6%
	Sixth	3	2.3%
Have you ever used brain stimulant drugs?	Yes	93	71.5%
	No	37	28.5%
Have you ever seen your peers or relatives use brain stimulant drugs	Yes	93	71.5%
	No	37	28.5%
Total		130	100%

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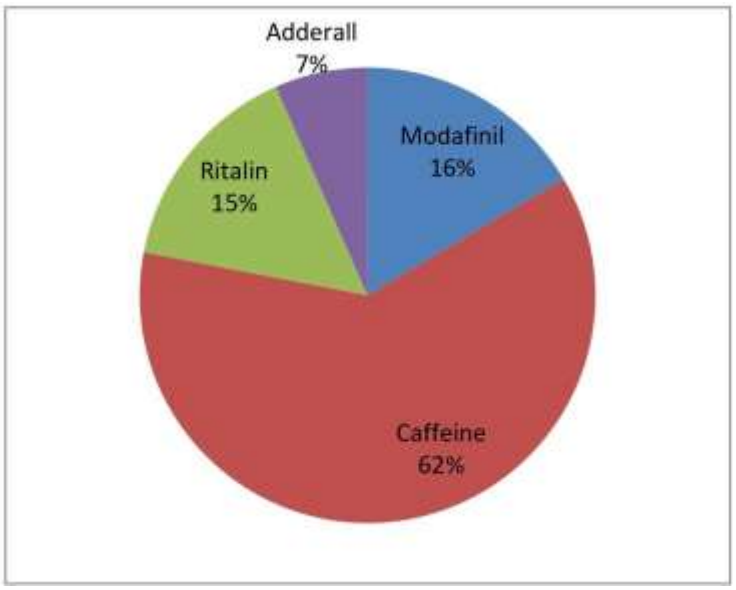

Figure 1: Types of Brain Stimulant Drug Usage Among Students

The most commonly used drugs were Caffeine (62%), Modafinil (16.1%), Ritalin (15.1%), and Adderall (7%).

Table 2: Correlation between use of brain stimulant drugs and Sex, College, Stage, and Peers (N=130).

Variable		Have you ever used brain stimulant drugs?				P - Value
		No		Yes		
		Frequency	Percentage	Frequency	Percentage	
Sex	Female	24	39.3%	37	60.7%	<0.05*
	Male	13	18.8%	56	81.2%	
College	Medicine	8	26.7%	22	73.3%	>0.05 N.S.
	Pharmacy	14	31.8%	30	68.2%	
	Dentistry	5	23.8%	16	76.2%	
	Nursing	1	11.1%	8	88.9%	
	Science	3	75.0%	1	25.0%	
	Engineering	5	25.0%	15	75.0%	
	Agriculture	1	100.0%	0	0.0%	
	Education	0	0.0%	1	100.0%	
Stage	First	2	25.0%	6	75.0%	<0.05*

Second		4	16.7%	20	83.3%	
Third		6	26.1%	17	73.9%	
Forth		20	50.0%	20	50.0%	
Fifth		4	12.5%	28	87.5%	
Sixth		1	33.3%	2	66.7%	
Seen peers	**Yes**	10	10.8%	83	89.2%	<0.01**
or relatives		27	73.0%	10	27.0%	
use brain stimulant drugs	**No**					

The prevalence of drug use was observed in both genders, with a higher percentage among males (81.2%) than females (60.7%). A significant correlation was found between drug use and gender, with males showing a higher propensity for usage. However, no significant correlation was found between drug use and college of study. Stage of study showed a significant correlation, with higher usage in the later stages of education. Additionally, a strong correlation was observed between personal drug use and witnessing peers or relatives using these drugs.

Table 3: Attitude and behavior among brain stimulant drugs users (N=93)

Variables		**Frequency**	**Percentage**
How frequently do you use these drugs	**Daily**	10	10.8%
	Monthly	23	24.7%
	Rarely	35	37.6%
	Weekly	25	26.9%
Do you believe that using brain stimulant impact on your physical health	**drugs has had an**	81	87.1%
Do you believe that using brain stimulant impact on your mental health?	**drugs has had an**	83	89.2%

Among users, the frequency of usage varied, with the majority using drugs rarely or monthly. A significant majority of users believed that these drugs impacted their physical (87.1%) and mental health (89.2%).

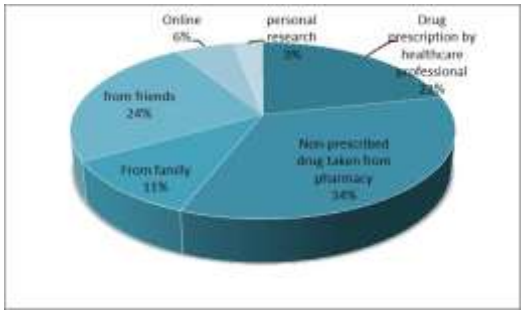

Figure 2: Sources of brain stimulant drugs (N=93)
Drugs were primarily sourced non-prescribed from pharmacies (34.3%) and through friends (24.5%). Prescriptions by healthcare professionals accounted for 21.6% of the sources.

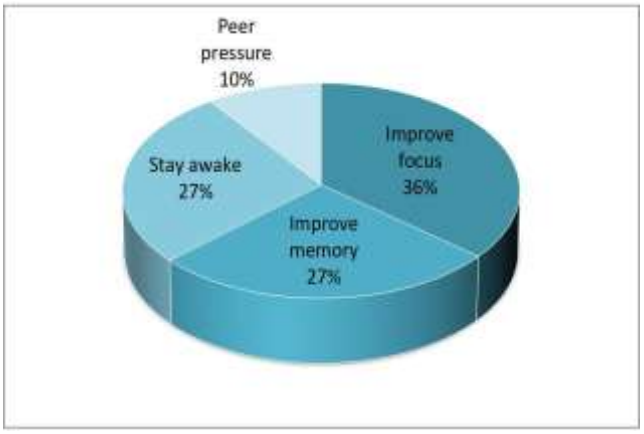

Figure 3: Reasons for taking brain stimulant drugs (N=93)
The primary reasons for using brain stimulant drugs were to improve focus (36%), improve memory, and stay awake (both 27%) while 10% of participants used brain stimulant drugs primarily due to peer pressure.

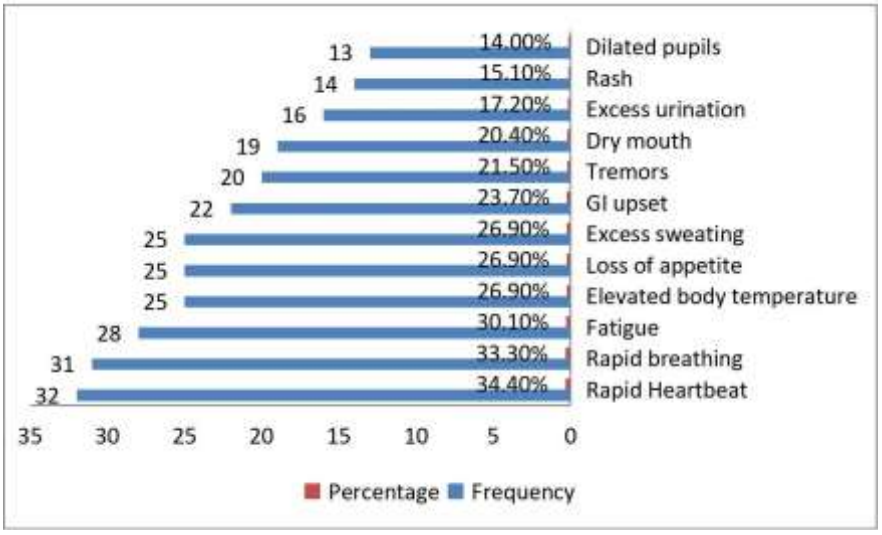

Figure 4: Physiological impact of taking brain stimulant drugs (N=93)
Common physiological effects reported included rapid heartbeat (34.4%), rapid breathing (33.3%), fatigue (30.1%), elevated body temperature, loss of appetite, excess sweating (all 26.9%), and gastrointestinal upset (23.7%). Other symptoms like tremors (21.5%), dry mouth (20.4%), excess urination (17.2%), rash (15.1%), and dilated pupils (14%) were also reported.

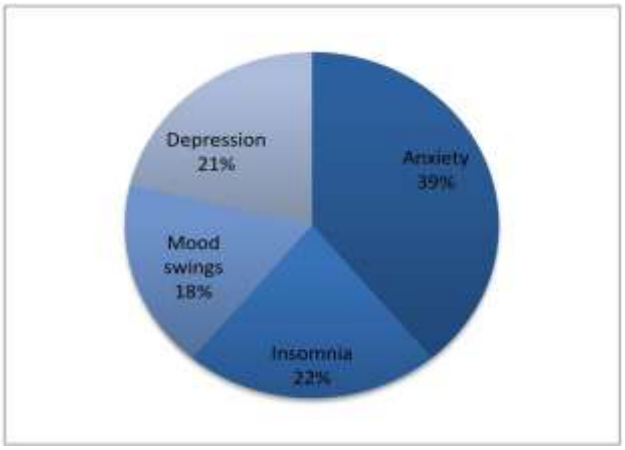

Figure 5: Psychological impact of brain stimulant drugs (N=93)
The psychological impact of drug use was significant, with anxiety (39%), insomnia (22%), mood swings (18%), and depression (21%) being commonly reported.

DISCUSSION

The current study found that 71.5% of students have used brain stimulant medications, which is consistent with the widespread phenomena of drug-induced augmentation of cognitive performance. Stimulant usage is known to be 15-20% common among medical students nationwide. A systematic reviewshows that 16–29% of students use non-prescription stimulants overall, whereas a U.S. survey found that 6.9% of college students have used non-prescription cognitive enhancers at some point in their lives [18].According to a Babol University of Medical Sciences survey, 11% of residents and medical students used methylphenidate and amphetamines mostly for concentration enhancement. Stimulant abuse was associated with factors like gender, housing situations, and psychiatric history [19]. According to a Saudi Arabian study, 2.46% of medical students use stimulants illegally, primarily to extend their study sessions [20]. This finding emphasizes how widespread the problem is.
Students utilized brain stimulant medicines at a high rate; the most popular one was caffeine (60.2%), followed by Adderall (6.5%), Ritalin (15.1%), and Modafinil (16.1%). About 14% of British medical students reported using neuroenhancing drugs at some point in their lives, with modafinil and ritalin being the most often used drugs. These medications were mostly obtained online or from friends in order to prepare for exams [21]. A different poll of university students in the UK and Ireland found that 10% of them had ever used modafinil, methylphenidate, or adderall for cognitive enhancement. Males, older students, and those who knew of other students who were using these drugs were more interested in these drugs [22].Coffee, caffeinated drinks, and tablets are common over-the-counter cognitive enhancers that contain caffeine. Its use by students around the world to improve focus, memory, or concentration is a global phenomenon with differing prevalence rates [23]. Prescription medications Adderall (amphetamine) and Ritalin (methylphenidate) are mostly used to treat ADHD, but healthy people are also using them more and more to improve their cognitive abilities. These drugs have the same potential for addiction and safety concerns as other psychostimulants like cocaine and amphetamines [24]. Another prescription medication for sleep disorders, modafinil, is similarly abused for its cognitive-boosting properties. Because of its wake-promoting properties and perceived safety profile in comparison to other stimulants like amphetamines and caffeine, it is frequently chosen [25].According to the current study, there are notable gender variations in the incidence of drug use among students, with males using drugs at higher rates than females. Research indicates that male students attending universities had a higher tendency to use substances such as alcohol, tobacco, and illegal drugs.This pattern holds true for different geographical locations and material types [26].The stage of the study in the present investigation has shown a substantial link with stimulant use, with higher usage in the latter educational stages. According to this pattern, demands and lifestyle adjustments related to higher academic levels may be a factor in rising drug usage [27].
The results of the current study showed a significant relationship between drug use on one's own and

seeing friends or family members use drugs. Peers and family are among the social networks that have a big impact on drug usage among college students. The influence of social modeling and surroundings on substance use behaviors is demonstrated by the substantial correlation between personal drug usage and witnessing peers or family members taking drugs [28]. Research suggests that non-prescription stimulants for prescription are frequently obtained via pharmacies or friends, which is consistent with the findings of the current study. An analysis of medical students and residents found a substantial correlation between the use of stimulant drugs, living in dorms, and having ahistory of psychiatric illnesses, and male gender. There were other sources found, such as recommendations from friends, self-medication, and doctor's prescription [29].Consistent with earlier research findings, the main motivations for stimulant use among university students are to enhance focus, memory, and sleep. These explanations are a reflection of the stress that students experience in the classroom and their belief that stimulants help them manage these obligations [30].Physiological symptoms that were frequently observed in the present study were dilated pupils, tremors, dry mouth, excessive urine, rash, weariness, raised body temperature, appetite loss, excessive perspiration, and rapid heartbeat and breathing. Psychologically, people frequently reported experiencing despair, anxiety, sleeplessness, and mood changes. Research has indicated that the non-medical use of prescription stimulants, such Adderall and Ritalin, can result in comparable physiological side effects, such as elevated heart rate, anorexia, and gastrointestinal issues. These effects are ascribed to these medications' stimulant qualities, which can affect several body systems [31].Stimulant use among students is linked to a number of psychosocial consequences. Mood swings, anxiety, and sleep issues are frequently noted. The effects of stimulants on the central nervous system and their disruption of regular brain functioning may be connected to these effects [32].

CONCLUSION

1- significant proportion of the student population at Tikrit University has engaged in the use of brain stimulant drugs. Caffeine emerged as the most commonly used drug, followed by Modafinil, Ritalin, and Adderall.
2- drug use was observed in both genders, with a higher percentage among males.
3- correlation was observed between personal drug use and the influence of peers or relatives who also use these drugs.
4- The reasons for using brain stimulant drugs varied, with the primary motivations being to improve focus, memory, and to stay awake.
5- Users reported both physiological and psychological impacts associated with drug use.

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