IRAQI Academic Scientific Journals NINEVAH UNIVERSITY JOURNAL OF MEDICAL SCIENCES Vol. 1, Issue 2, December 2025
NINEVAH UNIVERSITY NUJMS Journal of Medical Sciences
ISSN 3106-5430 (print)
ARTICLE

Benefits and Health Consequences of Using Stimulants among Health Care Staff in Nineveh Health Institutions

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Article information:

Received 24 October, 2025
Received in revised form 22November, 2025
Accepted 23 November, 2025
Final Proofreading 24 December, 2025
Published 31 December, 2025

DOI Online:

http://doi.org/10.64554/nujms.2025.1.2.9

Keywords:

Caffeine consumption; Caffeine perceived benefit; Stimulant's adverse effect.

ABSTRACT

Background: A stimulant is a substance used to make a person alert, can control weariness and improve performance and cognition. Many healthcare staff choose behavioral or pharmaceutical stimulants, among them the use of food-based stimulants and/or drugs that raise activity in the central nervous system.
Objectives: to study the prevalence, benefits, and side effects of using stimulants among healthcare staff in the Nineveh Health Institution.
Methods: A cross-sectional study was conducted among 4300 healthcare workers (medical and non-medical personnel) in the Nineveh Health institution over five months (January to May 2025). Using an electronic data collection form consisting of four sections: socio-demographic characteristics (8 items), frequency of stimulant use (6 items), perceived benefits of stimulant use (4 items), and side effects of stimulant use (5 items), with closed-ended questions. The chi-square continuity test was used to compare variables, and a P-value ≤ 0.05 was considered significant throughout data analysis.
Results: Out of 4300 participants, 1070 (24.9%) reported using stimulants. Coffee (20.2%) and tea (20.1%) were the most common stimulants. The primary reasons for use were to maintain alertness (44.6%) and as a dietary habit (39.3%). The most frequent side effects were sleep disturbance (67.0%) and tiredness (45.1%), which were most prevalent among married female medical staff aged 46 years or older working in hospitals. In contrast, health problems (29.2%) were more common among married males aged 46 years or older those were non-medical staff working in hospitals.
Conclusions: Healthcare staff use stimulants during work to be alert and as a dietary habit to overcome work overload, worries and anxiety that resulted in sleep disturbances, tiredness, and health problems that indirectly affected their performance and efficiency of the work, it is recommended to put strategies in place to improve the work environment and workers' personal lifestyles involving dietary diversification and caffeine consumption.

Introduction

Healthcare workplaces are dynamic and high-pressure environments where workers are often exposed to many challenges that affect their physical and mental capabilities. Chronic sleep disturbance, emotionally charged decision-making, and long hours are all typical pressures in it. In order to stay alert, control their weariness, and improve their performance, many healthcare staff choose a behavioral or pharmaceutical method. Among them, the use of food-based stimulants and/or drugs that raise activity in the central nervous system has become popular. The mechanism of action of these substances raises synaptic dopamine and norepinephrine. Although these substances increase alertness, they also increase the risk of dependency, sleeplessness, hypertension, and mood swings [1].

The use of stimulants by healthcare professionals exists on a spectrum from rational use to abuse. Rational use typically involves moderate consumption of legal, food-based stimulants like caffeine to transiently combat fatigue. Conversely, abuse encompasses the non-therapeutic use of prescription stimulants or excessive intake, which elevates the risk of dependency and adverse health outcomes. Caffeine, which may be found in coffee, tea, soft drinks, and energy drinks, is the most commonly used stimulant in the world. As an adenosine receptor antagonist, caffeine increases energy, attention, and response time while also encouraging alertness. Although modest dosages are generally seen to be safe, excessive usage might result in agitation, insomnia, anxiety and high blood pressure [2]. Cigarettes and vaping devices are prominent ways to provide nicotine. It quickly stimulates the brain's nicotinic acetylcholine receptors, which improves mood, reduces stress, and improves cognition in the short term. Although nicotine is thought to provide relaxing benefits, it is extremely addictive and linked to a number of health hazards, such as respiratory problems, cardiovascular disease, and cancer [3] [4]. The consumption of drinks with a high caffeine content is a growing phenomenon among individuals who work night shifts, including healthcare workers, to preserve a high level of wakefulness during the night. It is vital that shift workers continue to utilize nicotine as a psychological self-medication method when they are under stress [5]. The abuse of prescription stimulants, especially by those looking to improve their cognitive function, is a more alarming development. In addition to being prescribed for narcolepsy and attention-deficit/hyperactivity disorder (ADHD), amphetamines, methylphenidate, and modafinil are increasingly being abused by healthy people, including healthcare workers, to increase focus, work fatigue, or maintain productivity over extended clinical shifts. Although these drugs increase alertness, they bring the risk of dependency, emotional instability, sleeplessness, and hypertension [6]. Chronic dependence on stimulants can have serious negative effects, even if some kinds of stimulant use, particularly coffee, are institutionally accepted or even culturally normative. These include anxiety, heart strain, gastrointestinal issues, sleep disruptions, and the emergence of psychological dependency and tolerance. This can compromise patient safety and employee well-being in healthcare settings by lowering clinical performance, raising the possibility of mistakes, and causing long-term exhaustion [7]**.** Healthcare workers in Nineveh face extreme workplace pressures due to damaged infrastructure and resource shortages, leading to high stress and fatigue. This drives a high reliance on stimulants, primarily for alertness and as a dietary habit. However, this short-term solution creates a harmful cycle. The study confirms widespread side effects, including sleep disturbances and tiredness, which undermine worker health and performance. Therefore, this research is vital to address this counterproductive cycle and inform strategies to improve both the work environment and staff well-being.

The present research aims to study the prevalence, benefits, and side effects of using stimulants among healthcare staff in the Nineveh Health Institution.

Methods

The study is a cross-sectional study which was conducted over a period of five months (January–May 2025) among healthcare staff, stratifying them as [medical (doctors, dentists, pharmacists), nurses, midwives, and paramedics (health and laboratory assistants)] and non-medical (administrative, technical, and engineer)]. A randomly selected sample was then applied to select participants from each stratum across all health institutions in Nineveh Governorate. Participants were recruited from a range of health institutions, including hospitals, specialized centers, primary healthcare facilities, and administrative directorates. Eligibility was open to all healthcare workers aged 18 to 60, irrespective of their sociodemographic or professional characteristics. Individuals with incomplete data collection

forms or those who declined to participate were excluded from the final analysis. Sample size: 4300 divided into two groups, users of stimulants during work (1070) and those who didn't use stimulants (3230). According to the Annual Statistical Report by the Iraqi Ministry of Health (2023), the study sample represents 16.0% of the total staff in the Nineveh Health Directorate [8]. Using a self-reported electronic data collection form via Google Drive distributed to participants through WhatsApp groups with the assistance of research sub-committee members in health institutions in the Nineveh Health Directorate. The questionnaire consisted of four sections: (1) socio-demographic characteristics (8 items), (2) frequency of stimulant use (6 items), (3) perceived benefits of stimulant use (4 items) and (4) Health Consequences of stimulant use (5 items). The questionnaire items were adapted from various published sources and subsequently modified to fit the cultural and social context of the Mosul community. Both face and content validity were evaluated. Face validity was established by reviewing the clarity, simplicity, and relevance of the items, while content validity was ensured through expert evaluation and confirming that the items adequately covered the study constructs. The overall content validity index was 0.80, which is considered acceptable [9]. Reliability was evaluated through a pilot study, where internal consistency analysis was performed to confirm that the instrument yields stable and consistent results. A test–retest examination was done; the overall percentage agreement was 75% [10]. Continuing to provide healthcare for the population during the liberation process in 2017, leading to conflict and stress, resulting in increasing reliance on stimulants. Although the stimulants offer short-term relief, they pose long-term health risks, such as addiction, anxiety, and cardiovascular problems.

The study was approved by the Scientific Ethical Committee of Nineveh Health Directorate / Ministry of Health / Iraq (license number 260 on 2 Oct 2024, protocol number 2024192). Informed consent was obtained from all participants prior to their involvement in the study

Statistical analysis

The information regarding each participant was transferred into a code sheet, and data entry was done using an HP Core i5 8th-generation computer. Statistical analysis was done using Minitab version (19) and Excel version (2016) was considered. The percent agreement was used to measure the reliability of questionnaire variability with the McNemar test to assess statistical significance between the test and retest examination; the equation is as follows (11):
Percent agreement = Total agreement / Total number x 100

The data were presented in suitable tables. Percentages were calculated for the various group variables. Close-ended questions using an ordinal scale (infrequently, once daily, 2–3 times daily, more than 3 times daily) were used for answers in part II, while a simple dichotomy (yes and no) with multiple responses was used for parts III and IV. Chi-square continuity is used to compare between variables (user, benefit and side effect with certain sociodemographics). A p-value ≤ 0.05 was considered significant throughout data analysis.

Results

Socio demographic characters of study sample.

Table (1) shows the distribution of the study sample according to socio-demographic characteristics. Among the 4300 participants, 2285 (53.1%) were male and 2015 (46.9%) were female. The largest age group was 26-35 years, comprising 1868 (43.5%) participants. The majority of participants were married (2985, 69.4%). Regarding education, 1765 (41.0%) had a university education and 395 (9.3%) had higher education, meaning half of the participants (50.3%) had university or higher qualifications. Most participants were medical staff (3305, 76.8%), worked in hospitals (2788, 64.8%), and worked morning shifts (3375, 78.5%).

Table (1): Distribution of study sample according to socio-demographic characters

Category	No. = (4300)	%
Sex		
Male	2285	53.1
Female	2015	46.9
Age groups in years		
18-25	763	17.7
26-35	1868	43.5
36-45	993	23.1
≥46	676	15.7
Marital status		
Married	2985	69.4
Single	1223	28.4
Others	92	2.2
Educational level		
Primary	88	2.0
Secondary	305	7.1
Diploma	1747	40.6
University	1765	41.0
Higher education	395	9.3
Residence		
Urban	3662	85.2
Rural	638	14.8
Specialty		
Medical, nurse and paramedical staff *	3305	76.8
Non-medical staff**	995	23.2
Place of work		
Hospital	2788	64.8
Specialized center	438	10.2
Primary Health Care Center/ Sectors	940	21.9
Directorate head quarter and their department	134	3.1
Work Shift		
Morning	3375	78.5
Evening	925	21.5

* Doctor, dentist, pharmacist, nurse, midwife and health and laboratory assistants)

** Administrative, technical, and engineer

The association between stimulant use and socio-demographic characteristics is presented in Table (2). Among the 1070 users, a significantly higher prevalence was observed among specific demographics: females (625, 31.0% of all females), individuals aged 46 years or older (256, 37.8% of this age group), and those working in directorate headquarters (95, 70.8% of staff at this site) and specialized centers (191, 43.6% of staff at this site). Furthermore, users were more likely to have a secondary education (175, 57.3%) or a diploma (578, 33.0%), and to have 5-9 years of professional experience (164, 31.3%). A statistically significant association (p-value ≤ 0.05) was found between stimulant use and all socio-demographic variables except for the work shift.

Table (2): Association between using stimulant and socio-demographic characters

Category	User No.= (1070)		Non-user No. (3230)		Total No. (4300)		P-Value*
	No.	%	No.	%	No.	%	
Sex							
Male	445	19.5	1840	80.5	2285	53.1	0.000
Female	625	31.0	1390	69.0	2015	46.9	
Age groups in years							
18-25	162	21.2	601	78.8	763	17.7	0.000
26-35	542	29.0	1326	71.0	1868	43.5	
36-45	110	11.1	883	88.9	993	23.1	
≥ 46	256	37.9	420	62.1	676	15.7	
Marital status							
Married	701	23.5%	2284	76.5%	2985	69.4	0.006
Single	342	28.0%	881	72.0%	1223	28.4	
Others**	27	29.3	65	70.7	92	2.2	
Educational level							
Primary	23	26.1	65	73.9	88	2	0.000
Secondary	175	57.4	130	42.7	305	7.1	
Diploma	578	33.1	1169	67.0	1747	40.6	
University	222	12.6	1543	87.5	1765	41	
Higher education	72	18.2	323	81.8	395	9.3	
Specialty							
Medical	867	26.2	2438	73.8	3305	76.8	0.000
Non-Medical	203	20.4	792	79.6	995	23.2	
Residence							
Urban	947	25.9	2715	74.1	3662	85.2	0.000
Rural	123	19.3	515	80.7	638	14.8	
Place of work							
Hospital	590	21.1	2198	78.9	2788	64.8	0.000
Specialized center	191	43.6	247	56.4	438	10.2	
Primary Health Care Center/Sectors	194	20.6	746	79.4	940	21.9	
Directorate head quarter and their department	95	70.9	39	29.2	134	3.1	
Work Shift							
Morning	843	25.0	2532	75.1	3375	78.5	0.785
Evening	227	24.5	698	75.5	925	21.5	
Years of experiences							
≤ 4 years	488	25.7	1409	74.3	1897	44.2	0.000
5-9	164	31.3	360	68.7	524	12.1	
10-14	185	27.4	489	72.6	674	15.7	
15-19	106	21.5	386	78.5	492	11.4	
≥20	126	17.7	587	82.3	713	16.6	

*Using χ^2 test **(widow, divorce)

Frequency of using stimulant during work among participants

Table (3) showed frequency of using stimulant during work among participants, nearly one fourth 1070 (24.9%) of participant were using stimulant during work time, drinking coffee was among 880 (20.2%), drinking tea among 863(20.1%), and drinking an energy drink among 155 (3.6%). Using stimulant drug during work cigarette smoking, and electronic cigarette smoking were 40 (0.9%), 139 (3.2%), and 61 (1.4%) respectively among study sample.

Table (3): Frequency of using stimulant during work among participants.

Using Stimulant During Work		
Categories*	No.	%
Yes	1070	24.9
daily	585	13.6
Infrequently	485	11.3
No	3230	75.1
Frequency of drinking a cup of coffee during work		
Don't drink	3420	79.5
Drinking coffee	880	20.5
Infrequently	495	11.5
Once daily	262	6.1
2-3 time daily	105	2.5
>3 time daily	18	0.4
Frequency of drinking a cup of tea during work		
Don't drink tea	3437	79.9
Drinking tea	863	20.1
Infrequently	134	3.1
Once daily	388	9.1
2-3 time daily	246	5.7
>3 time daily	95	2.2
Frequency of drinking energy power drink during work		
Don't drink	4145	96.4
Drinking energy power drink	155	3.6
Infrequently	119	2.8
Once daily	26	0.6
2-3 time daily	6	0.1
>3 time daily	4	0.1
Frequency of cigarette smoking during work		
Non- Smoker	4161	96.8
Smoker	139	3.2
< 3 cigarettes daily	36	0.8
3-5 cigarettes daily	25	0.6
>5 cigarettes daily	78	1.8
Frequency of electronic cigarette smoking during work		
Non- User	4239	98.6
User	61	1.4
< 3 time daily	14	0.3
3-5 time daily	12	0.3
>5 time daily	35	0.8
Frequency of using stimulant drug during work		
Non- User	4260	99.1
User	40	0.9
< 3 time daily	30	0.7
3-5 time daily	5	0.1
>5 time daily	5	0.1

*Multiple response.

IRAQI Academic Scientific Journals NINEVAH UNIVERSITY JOURNAL OF MEDICAL SCIENCES Vol. 1, Issue 2, December 2025
NINEVAH UNIVERSITY NUJMS Journal of Medical Sciences
ISSN 3106-5430 (print)
ARTICLE

Benefit of using stimulant during work

The commonest benefit of using stimulant during work was to be alert during work 478 (44.6%), then as a dietary habit 420(39.3%) and a lesser extent 311 (29.1%) to avoid worries and anxiety this is clear in (Figure 1)

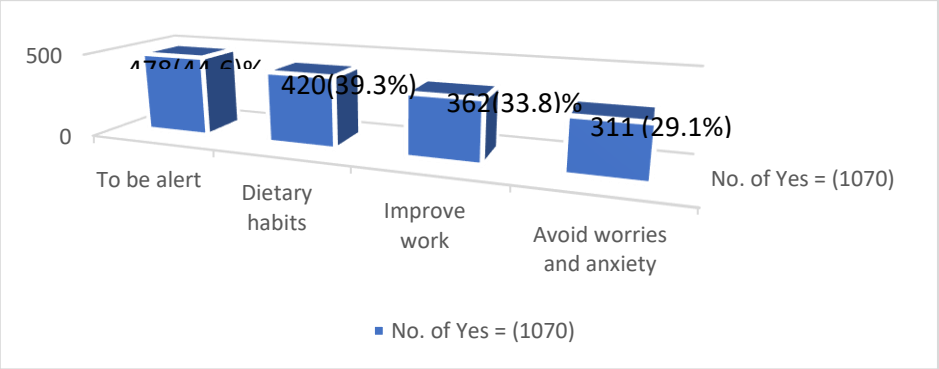

Figure (1): Benefit of using stimulant during work among participants.

Association between benefit of using stimulant and socio-demographic characters seen in Table (4). The benefit of using stimulant to be alert, seen among female 324 (67.8%), age group 36-45 years old 150 (31.4%), medical personnel 398 (83.2%), married 323 (67.5%), and health care providers were working in hospitals 389 (81.3%), While using stimulant as a dietary habit was seen among female 396 (94.3%), 46 years of age or older 111 (26.4%), married 335 (79.8%), working in hospitals 234 (55.7%). Avoidance of worries and anxiety was seen among females 200 (64.3%), medical personnel 245 (78.8%) and working in hospital 278 (89.3%).

Table (4): Association between benefit of using stimulant and socio-demographic characters

Category	Benefit of using Stimulant*							
	To be alert		Dietary habits		Improve work		Avoid worries and anxiety	
	No.	%	No.	%	No.	%	No.	%
Sex								
Male (445)	154	32.2	24	5.7	217	59.9	111	35.7
Female (625)	324	67.8	396	94.3	145	40.1	200	64.3
Age groups in years								
18-25 (177)	99	20.7	106	25.2	87	24.0	91	29.3
26-35 (542)	107	22.3	99	23.6	78	21.6	42	13.5
36-45 (222)	150	31.4	104	24.8	98	27.0	67	21.5
≥ 46 (129)	122	25.6	111	26.4	99	27.4	111	35.7
Specialty								
Medical (867)	398	83.2	225	53.5	163	45.0	245	78.8
Non-Medical (203)	80	16.8	195	46.5	199	55	66	21.2
Marital status								
Married (701)	323	67.5	335	79.8	250	69	278	89.4
Single (342)	133	27.8	60	14.2	100	27.7	13	4.2
Others** (27)	22	4.7	25	6.0	12	3.3	20	6.4
Place of work								
Hospital (590)	389	81.3	234	55.7	200	55.2	278	89.4
Other site# (480)	89	18.7	186	44.3	162	44.8	33	10.6
Total (1070) ##	478	44.6	420	39.3	362	33.8	311	29.1

*Multiple response. **(widow, divorce).

#Other site (Specialized Center, Primary Health Care Center, Primary Health Care Sectors, Directorate head quarter and their department

P-Value =(0.000)

IRAQI Academic Scientific Journals NINEVAH UNIVERSITY JOURNAL OF MEDICAL SCIENCES Vol. 1, Issue 2, December 2025
NINEVAH UNIVERSITY NUJMS Journal of Medical Sciences
ISSN 3106-5430 (print)
ARTICLE

Side effect of using stimulants among participant

Figure (2): demonstrate side effect of using stimulants among participants as common problem were sleep disturbance and tiredness, they were 717 (67.0%), 483 (45.1%), respectively and health problem least reported, it was 313 (29.2%)

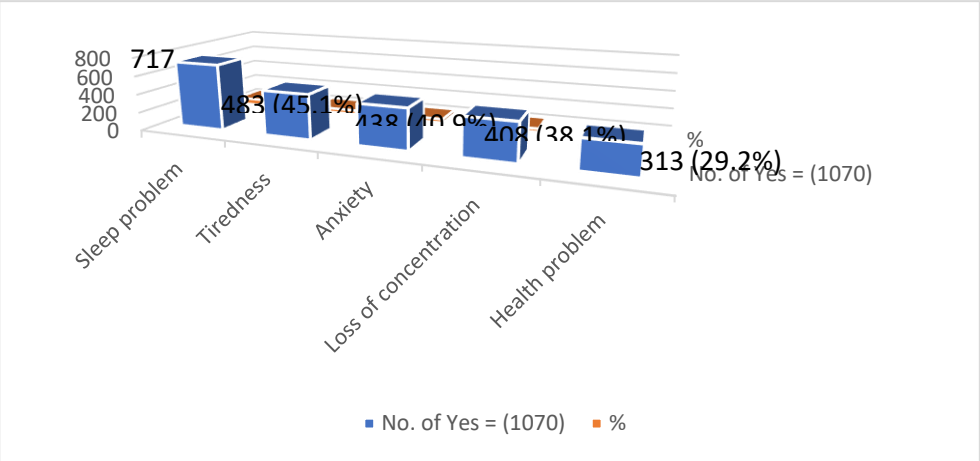

Figure (2): Side effect of using stimulants among participant

Table (5) shows the association between developing side effects and certain socio-demographic characteristics. **Sleep disturbance** was the most prevalent side effect (67.0%), reported most frequently by female (69.7%), married (83.3%), medical personnel (79.0%) aged 46 or older (47.4%) working in hospitals (75.7%). The second most common side effect was **tiredness** (45.1%), which was also predominantly reported by female (74.6%), married (72.0%) medical staff (67.3%) working, in hospitals (85.3%). Conversely, **anxiety** (40.9%) was more common among male participants (78.7%), particularly those in the 36-45 age groups (53.4%), who were married (72.1%) and worked in hospitals (78.7%). **Loss of concentration** (38.1%) was most associated with participants aged 46 or older (56.9%), married (82.5%), and working in hospital settings (78.6%). Finally, **health problems** (29.2%) were reported most by male (74.7%), non-medical staff (58.1%), aged 46 or older (53.3%), who were married (61.0%) and working in hospitals (73.8%).

Table (5): Association between developing side effect and certain socio-demographic characters

Category	Side Effect*									
	Sleep problem		Tiredness		Anxiety		Loss of concentration		Health problem	
	No.	%	No.	%	No.	%	No.	%	No.	%
Sex										
Male (445)	217	30.3	123	25.4	345	78.7	142	34.8	234	74.7
Female (625)	500	69.7	360	74.6	93	21.3	266	65.2	79	25.3
Age groups in years										
18-25 (177)	54	7.5	98	20.2	17	3.9	36	9.1	32	10.2
26-35 (542)	100	13.9	158	32.8	97	22.1	40	9.8	36	11.5
36-45 (222)	223	31.2	104	21.5	234	53.4	99	24.2	78	25.0
≥ 46 (129)	340	47.4	123	25.5	90	20.6	233	56.9	167	53.3
Specialty										
Medical (867)	567	79.0	325	67.3	345	78.8	245	60.0	131	41.9
Non-Medical (203)	150	21.0	158	32.7	93	21.2	163	40.0	182	58.1
Marital status										

Married (701)	597	83.3	348	72.0	317	72.1	337	82.5	191	61.0
Single (342)	100	13.9	123	25.5	98	22.7	54	13.3	102	32.6
Others** (27)	20	2.8	12	2.5	23	5.2	17	4.2	20	6.4
Place of work										
Hospital (590)	543	75.7	412	85.3	345	78.7	321	78.6	231	73.8
Other site[#] (480)	174	24.3	71	14.7	93	21.3	87	21.4	82	26.2
Total (1070) [##]	717	67.0	483	45.1	438	40.9	408	38.1	313	29.3

*Multiple response. **(widow, divorce).
[#]Other site (Specialized Center, Primary Health Care Center, Primary Health Care Sectors, Office Center).
[##] P-Value = (0.000)

Discussion

This study assessed the prevalence, patterns, and perceptions of stimulant use among healthcare and non-medical staff across different health institutions. The results indicate that stimulant consumption is a common behaviour, influenced by socio-demographic and occupational factors, with both perceived benefits and reported adverse effects.

The prevalence of stimulant use during work was relatively high, with nearly one-fourth (24.9%) of participants reporting active use. Coffee and tea were the most common stimulants, while energy drinks, cigarettes, electronic cigarettes, and stimulant drugs were reported less frequently. This trend is consistent with international literature showing caffeine-containing beverages as the most widely consumed stimulants among healthcare professionals, often used to combat fatigue and maintain alertness during long working hours [12]. Caffeinated energy drinks have been a growing problem in the USA since 2009, leading to caffeine intoxication due to an absence of pharmacological tolerance and certain genetic factors [13]. A study among 600 individuals from different sectors and social groups of Erbil, Iraq, in 2017 revealed that the prevalence of energy drinks was 42.7%, with age ≤ 25 years and males more than females (55.7% and 29.8%, respectively). The main reasons for its consumption are to improve the mood and performance (66.0% and 30.4%, respectively) [14].A similar finding was seen among young Iraqi adults in 2022, as increasing prevalence of consumption of energy drinks is in favour of dependence [15].

In a cross-sectional study in Anbar, Iraq, 2024, among 415 female students, they comprised 63.1% of the participants. The study concluded that the commonest beverage was caffeinated, with a frequency of daily use with an increasing pattern [16].

A review of experimental studies about the benefit of caffeine in Alzheimer's disease, showed that dietary use of caffeine in the form of coffee and/or tea improves cognitive behaviour and/or prevents deterioration from the disease [17].

Association between using stimulants and sociodemographic characteristics of the study sample

Significant associations were found between stimulant use and sex, age, marital status, educational level, place of work, and years of experience. While the highest *proportion* of users was found among those aged 46 years or older (37.8%), the largest absolute number of users belonged to the 26-35year age group (542 participants, representing 29.0% of that cohort). This pattern indicates a high prevalence across multiple age groups. Furthermore, stimulant use was significantly higher among female participants, married staff, and those working in directorate headquarters and specialized centres. This suggests that a combination of occupational demands, social responsibilities, and specific workplace environments contributes to an increased reliance on stimulants. Previous studies have similarly demonstrated that work environment, job stress, and family obligations influence stimulant intake among health professionals.

Several studies in healthcare either find no effect related to sex difference [17] or higher use among males/younger clinicians, especially for energy drinks and nicotine, thus partly disagreeing with your pattern [12] [15] [17]. The age pattern also disagrees with energy-drink literature (skews younger) [18] but is plausibly aligned with coffee/tea habits that consolidate with age and seniority [19].

Benefits of using stimulants in the workplace among healthcare staff

The main use of stimulant were to remain alert (44.6%) and as part of dietary habits (39.3%), while fewer participants cited avoidance of anxiety. This pattern is in line with findings that "alertness" is the most common motivation for caffeine or stimulant abuse among physicians and nurses. A large proportion of participants believed that stimulant use reduced work overload and decreased stress, a direct personal benefit. Middle-aged participants (36-45 years) and medical staff were more likely to perceive stimulants as stress-relieving and performance-enhancing. These findings support earlier reports that healthcare workers often use stimulants to maintain cognitive performance and cope with occupational stress. [20][21]. The present study shows sstimulants use among medical personnel overall and particularly high proportions in directorate headquarters and their department and specialised centres (vs hospitals/PHC). This finding aligns with Mober et al [22], who report indicating similar or higher caffeine reliance among clinicians compared to administrative staff, while others find the highest reliance in emergency units and night-shift nurses. Disagreement with present study, they were reported among healthcare workers in the directorate headquarters and their department due to a shortage of staff with local workload versus shift work in other institutions [18] [19]. Differences in measurement (day vs night, intensity vs any use) probably account for these discrepancies [23].

Side effects of using stimulants and health concerns

Despite perceived benefits, many participants reported side effects, the most frequent being sleep disturbance (67.0%) and tiredness (45.1%). These adverse effects are consistent with known physiological outcomes of excessive abuse of stimulant and caffeine consumption, which disrupt sleep and can lead to fatigue, poor concentration and long-term health issues. Interestingly, health-related problems were more common among older and non-medical participants, suggesting possible differences in tolerance and lifestyle patterns. [20] [21] [23].

Conclusions

The present study concluded that one fourth of health work staff use beverage stimulants, commonly coffee and tea. The more prevalent cause for stimulant use is alertness to overcome work overload and as a dietary habit, and its excessive use results in sleep disturbance and tiredness, which requires strategies to restrict stimulant abuse.

Acknowledgements

The authors would like to express their thanks to all research sub-committee member who facilitate distribution of data collection and to all health care workers who participated in the study.

Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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