



Evaluation of the Psychiatric and Addictive Medications Prevalence in Urine of Patients at Benghazi Mental Health Institutions-Libya

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تقييم انتشار الأدوية النفسية والإدمانية في بول المرضى بمؤسسات الصحة النفسية ببنغازي-ليبيا

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Abstract:

Drug addiction has emerged as a significant public health concern, with treatment strategies contingent upon the specific substance used and any coexisting medical or mental health conditions. Diagnostic evaluations, including blood, urine, or other laboratory tests, are commonly employed to assess the use of narcotics and psychiatric medications. These assessments play a crucial role in monitoring both treatment efficacy and patient recovery. The present study aimed to investigate the prevalence of psychiatric and addictive substances detected in the urine of patients undergoing treatment, with a particular focus on gender differences, timing of urine drug testing, hospital departments involved, and patient admission rates. The research was conducted at the Hospital for Psychiatric and Neurological Diseases in Benghazi, Libya. Data were extracted from medical records of 1,897 hospitalized patients over the period from March 2022 to September 2023. The study involved a comprehensive statistical analysis of substances identified in urine drug testing, including amphetamines, tetrahydrocannabinol (THC), cocaine, benzodiazepines, methadone, tricyclic antidepressants (TCA), proteolytic enzyme complex (TRMA), and barbiturates.

Keywords: THC and Cocaine, Benzodiazepine, Methadone, TCA, TRMA and Barbiturate.

الملخص

أصبحت إدمان المخدرات قضية صحية عامة كبيرة، حيث تعتمد استراتيجيات العلاج على نوع المادة المستخدمة وأي حالات طبية أو اضطرابات نفسية مصاحبة. تُستخدم التقييمات التشخيصية، بما في ذلك اختبارات الدم والبول أو الاختبارات المخبرية الأخرى، بشكل شائع لتقييم استخدام المواد المخدرة والأدوية النفسية. وتلعب هذه التقييمات دورًا حيويًا في مراقبة فعالية العلاج وتعافي المرضى. هدفت هذه الدراسة إلى التحقيق في مدى انتشار المواد النفسية والإدمانية المكتشفة في بول المرضى الذين يتلقون العلاج، مع التركيز على الفروقات بين الجنسين، توقيت اختبارات البول للكشف عن المخدرات، أقسام المستشفى المعنية، ومعدلات دخول المرضى. أُجريت الدراسة في مستشفى الأمراض النفسية والعصبية في بنغازي، ليبيا. وتم استخراج البيانات من السجلات الطبية لـ 1,897 مريضًا تم إدخالهم إلى المستشفى خلال الفترة من مارس 2022 إلى سبتمبر 2023. وشملت الدراسة تحليلًا إحصائيًا شاملاً للمواد التي تم اكتشافها في اختبارات البول، بما في ذلك الأمفيتامينات، رباعي هيدرو كانابينول (THC)، الكوكايين، البنزوديازيبينات، الميثادون، مضادات الاكتئاب ثلاثية الحلقات (TCA)، مركب الإنزيم المحلل للبروتين (TRMA)، والباربيتورات.

Introduction

Psychiatric medications have become foundational to the management of diverse mental health disorders, marking a substantial advancement in the domain of mental healthcare. These pharmacological agents, commonly referred to as psychotropic medications, possess the capacity to modulate neural chemistry, influence physiological processes, and shape an individual's cognitive functions, emotional states, awareness, and perceptions [1]. They are predominantly prescribed to address conditions such as depression, anxiety, agitation, hallucinations, attention deficit hyperactivity disorder (ADHD), bipolar disorder, and schizophrenia [2]. However, despite their critical role in the treatment of clinically diagnosed mental health conditions, there has been a notable global increase in their utilization among the general population. This trend can be attributed to various factors, including an increase in the diagnosis rates of psychiatric disorders, the introduction of novel psychotropic medications, and the evolution of therapeutic guidelines for existing treatments [3].

The interrelationship between mental health and social sustainability is profound, as mental health conditions exert a significant impact on both individuals and societal structures. Disorders such as depression and anxiety are associated with reduced productivity, workplace absenteeism, suicide, and other adverse outcomes that undermine social and economic well-being. Alarming, global suicide rates remain persistently high, with a suicide occurring approximately every 40 seconds, resulting in over 700,000 deaths annually [4]. Moreover, substantial research has elucidated the intricate connections between psychological and physical health. Investigations have highlighted the associations between mental stress and physical illnesses such as cancer, respiratory diseases, and kidney disorders, as well as the reciprocal effects of physical health conditions, such as obesity and smoking, on mental well-being [5,6]. Individuals grappling with mental health challenges often resort to substance use or addictive behaviors as coping mechanisms. However, such behaviors frequently exacerbate underlying mental health issues, creating a destructive cycle of dependency and deteriorating overall health [7]. Substance abuse, particularly smoking, poses grave health risks, with over 16 million Americans experiencing severe health complications attributable to smoking [8]. Similarly, substance use disorders impact millions, underscoring the widespread and pervasive nature of this public health challenge [9] (AAC, 2022).

Social and environmental factors exert a profound influence on health outcomes, with social determinants such as education, income, and access to healthcare playing a pivotal role in shaping individuals' well-being and quality of life [10]. Addressing these determinants is essential for understanding health disparities and developing targeted interventions. Given the multifaceted nature of these issues, comprehending the complexities surrounding the use of psychiatric medications, substance abuse, and their interplay with mental and physical health is crucial for designing effective strategies to enhance overall well-being. Mental health disorders stemming from major psychiatric illnesses present an escalating public health challenge, accounting for approximately 14% of the global disease burden. The effective management of these conditions is often hindered by widespread medication non-adherence, a critical issue that remains insufficiently documented. There is a notable lack of concise evidence regarding the prevalence of non-adherence to psychotropic medications and the multifactorial causes contributing to it [11].

In response to these challenges, the World Health Organization (WHO) implemented a comprehensive strategic action plan for the period 2013–2020. This initiative focused on promoting mental health, preventing psychiatric disorders, and providing psychological and moral care to reduce morbidity, disability, and mortality associated with mental illnesses [12]. Among the populations most vulnerable to substance abuse are young individuals, particularly adolescents, who exhibit disproportionately high rates of misuse involving opioids, benzodiazepines, and synthetic stimulants compared to the general population across all global regions [13,14]. Of particular concern is the non-medical use of pharmaceutical opioids, especially tramadol, which has emerged as a significant public health issue in various countries. This trend contributes notably to the widespread non-medical use of prescription medications, particularly in regions such as North, West, and Central Africa, as highlighted by the United Nations Office on Drugs and Crime (UNODC) [15].

Globally, substance abuse remains a pressing public health challenge. According to UNODC data, approximately 275 million individuals engage in the consumption of illicit substances, including

cannabis, amphetamines, opioids, and cocaine, with an annual prevalence of 5.6% reported in 2016. Cannabis is identified as the most commonly abused drug, with an estimated 192 million users worldwide. Furthermore, the World Health Organization documented a significant increase in drug overdose fatalities, reaching 168,000 deaths in 2015, with opioids accounting for the majority of these fatalities [16]. The present study aims to examine the prevalence and patterns of misuse associated with the repeated consumption of psychiatric and addictive medications among patients receiving treatment at the Hospital for Psychiatric and Neurological Diseases in Benghazi, Libya. Particular emphasis is placed on analyzing gender-specific differences to provide a nuanced understanding of the factors influencing these patterns.

Materials and Methods

Study Design

This descriptive and retrospective epidemiological study investigated the utilization patterns of narcotics and psychiatric medications among hospitalized patients at Dr. Ali Al-Ruwai's Hospital for Psychiatric and Neurological Diseases in Benghazi, Libya. The study analyzed data retrieved from medical records of patients admitted between March 2022 and September 2023, encompassing a total of 1,897 documented cases. Key aspects evaluated included gender differences, the timing of urine drug testing, the specific medications detected in urine samples—including amphetamines, tetrahydrocannabinol (THC), cocaine, benzodiazepines, methadone, tricyclic antidepressants (TCA), proteolytic enzyme complex (TRMA), and barbiturates—and the association between hospital wards and patient admission rates.

Variables

The primary variables analyzed in this study were:

- Gender: Categorized as male or female.
- Types of medications and drugs: Including the specified substances tested in urine samples.
- Patient recipient units: Hospital wards where the patients were treated.
- Statistical Analysis
- Data were analyzed using SPSS version 26. Descriptive statistics, including frequency and percentage distributions, were calculated and visualized using bar charts and pie charts.

To identify statistically significant differences in qualitative variables, the chi-square test was employed, with a significance threshold set at $p < 0.05$. Results were systematically presented in tables, with all statistically significant findings explicitly highlighted.

Results and Discussion

Gender Distribution

Among the 1,897 patients included in the study, an overwhelming majority were male, accounting for 1,885 patients (99.4%), while females represented only 12 patients (0.6%) as illustrated in Figure 1). This significant gender disparity highlights the predominance of male patients in this healthcare setting.

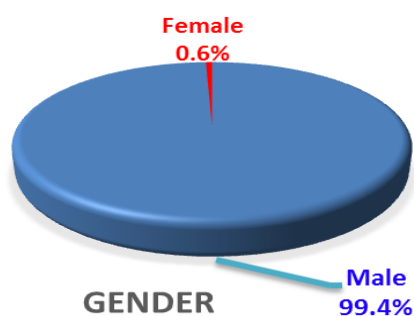


Figure 1: The percentage of males (shown in blue) and females (shown in red).

Timing of Urine Analyses

The distribution of patient admissions across the study period exhibited notable fluctuations. From month 1 to month 4, a total of 579 patients were admitted, representing 30.5% of the total admissions. The highest admission rates were recorded between month 5 and month 8, with 767 patients, accounting for 40.4% of the total. However, admissions declined in the period from month 9 to month 12, with 551 patients, comprising 29.0% of the total as demonstrated in Figure 2.

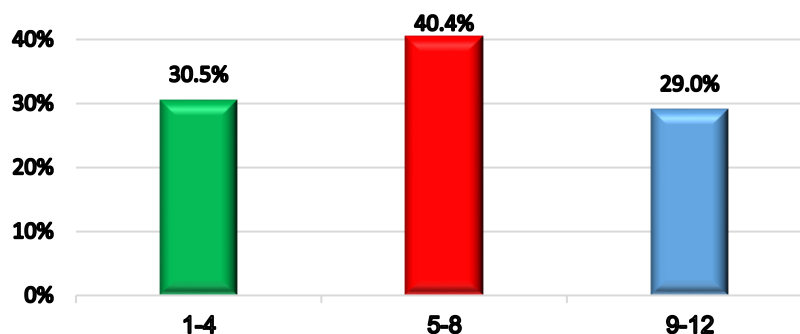


Figure 2: The timing of urine analysis, categorized into months 1-4 green, 5-8 (red), and 9-12 (blue).

Drug Usage by Month

The analysis of amphetamine usage among psychiatric patients revealed significant temporal variations. Between month 1 and month 4, the average positivity rate was 4.30%, while 31.20% of patients tested negative. This positivity rate increased substantially to 42.60% during months 5 to 8, with 40.40% testing negative. From month 8 to month 12, the positivity rate peaked at 53.20%, with a reduced percentage of 28.40% testing negative as presents in Table 1.

Table 1: The usage of patients who took and those who did not take amphetamine medication over the months.

Month		Amphetamine		χ^2	P_value
		Positive	Negative		
1-4	N	2	577	20.621	0.00
	%	4.30%	31.20%		
5-8	N	20	747		
	%	42.60%	40.40%		
9-12	N	25	526		
	%	53.20%	28.40%		

Urine test results for epilepsy patients using tetrahydrocannabinol (THC) also demonstrated variability over time. During months 1 to 4, the usage rate was 30.30%, while 30.70% of patients tested negative. This rate increased to 43.00% between months 5 to 8, with 38.10% abstaining. However, in the period from month 8 to month 12, the usage rate dropped to 20.20%, with 29.90% testing negative as shown in Table 2.

The increasing positivity rate for amphetamine use across the study period suggests escalating misuse or reliance on this substance among psychiatric patients. The peak in positivity during the latter half of the year may indicate heightened stressors, changes in availability, or shifts in prescribing patterns. This trend underscores the need for targeted interventions to mitigate amphetamine misuse, particularly during periods of increased vulnerability. The fluctuating THC usage rates among epilepsy patients highlight complex patterns of substance use in this subgroup. The initial increase in THC usage from months 1 to 8 might reflect attempts to self-medicate or a perception of THC's therapeutic benefits. The subsequent decline during months 8 to 12 could result from stricter monitoring, reduced access, or seasonal changes in behavior. These findings emphasize the importance of ongoing monitoring and tailored strategies to address substance use among both psychiatric and epilepsy patients.

Interventions should focus on education, counseling, and controlled substance regulation to reduce misuse and improve patient outcomes.

Table 2: The usage of patients who took and those who did not take THC medication over the months.

Month		THC		x^2	<i>P_value</i>
		Positive	Negative		
1-4	N	270	309	6.196	0.045
	%	30.30%	30.70%		
5-8	N	383	384		
	%	43.00%	38.10%		
9-12	N	237	314		
	%	26.60%	31.20%		

The analysis of urine test results revealed temporal variations in the use of barbiturates, a sedative and hypnotic drug, among psychiatric patients. During months 1 to 4, 38.50% of patients tested positive for barbiturate usage, while 30.50% tested negative. The positivity rate increased to 46.20% in months 5 to 8, with 40.40% of patients abstaining. However, in the period from month 8 to month 12, the positivity rate declined significantly to 15.40%, while 29.10% of patients tested negative, as depicted in Table 3.

Table 3: The monthly distribution of barbiturate usage among patients, distinguishing between those who tested positive and those who tested negative.

Month		Methadone		x^2	<i>P_value</i>
		Positive	Negative		
1-4	N	2	577	3.452	0.178
	%	16.70%	30.60%		
5-8	N	8	759		
	%	66.70%	40.30%		
9-12	N	2	549		
	%	16.70%	29.10%		

The findings from the urine tests revealed that, among patients administered benzodiazepine for anxiety treatment, the usage rate between months 1 and 4 was 24.50%, while 30.90% of patients refrained from its use. In the subsequent months (5 to 8), the usage rate increased to 40.20%, while 40.40% of patients reported not using the medication. However, between months 9 and 12, the usage rate decreased to 35.30%, with 28.70% of patients not using it as illustrated in Table 4. In contrast, patients receiving methadone for addiction treatment exhibited a usage rate of 16.70% between months 1 and 4, while 30.60% abstained from its use. During months 5 to 8, the usage rate significantly increased to 66.70%, with 40.30% of patients reporting non-use. Between months 8 and 12, the usage rate stabilized at 16.70%, with 29.10% of patients not using the medication as presented in Table 5).

Table 4: Depicts the usage patterns of patients on benzodiazepine medication, distinguishing between those who used and those who did not, across the study periods.

Month		Benzodiazepine		x^2	<i>P_value</i>
		Positive	Negative		
1-4	N	25	554	2.727	0.256
	%	24.50%	30.90%		
5-8	N	41	726		
	%	40.20%	40.40%		
9-12	N	36	515		
	%	35.30%	28.70%		

Table 5: Depicts the usage of patients who took and those who did not take methadone medication over the months.

Month		Barbiturate		x^2	<i>P_value</i>
		Positive	Negative		
1-4	N	5	574	1.217	0.544
	%	38.50%	30.50%		
5-8	N	6	761		
	%	46.20%	40.40%		
9-12	N	2	549		
	%	15.40%	29.10%		

The urine analysis results indicate that among psychiatric patients receiving tricyclic antidepressants (TCAs) for depression treatment, the usage rate from months 1 to 4 was 33.10%, while 30.30% of patients abstained from its use. In the following period, months 5 to 8, the usage rate increased to 46.60%, while 39.90% of patients did not use the medication. However, from months 8 to 12, the usage rate declined to 20.20%, with 29.90% of patients refraining from its use as shown in Table 6. However, Table 7 presents the results of urine tests for various substances. Amphetamine was detected in 47 patients, representing 2.5%, tetrahydrocannabinol (THC) was found in 890 patients, accounting for the highest proportion at 46.9%, barbiturates were present in 13 patients (0.7%), and cocaine was detected in 4 patients, representing the lowest percentage at 0.2%.

Table 6: Displays the usage patterns of patients who took and those who did not take tricyclic antidepressant (TCA) medication over the study period.

Month		TCA		x^2	<i>P_value</i>
		Positive	Negative		
1-4	N	54	525	6.844	0.033
	%	33.10%	30.30%		
5-8	N	76	691		
	%	46.60%	39.90%		
9-12	N	33	518		
	%	20.20%	29.90%		

Table 7: Outlines the types of psychiatric medications and drugs.

		Positive	Negative
Amphetamine	N	47	1850
	%	2.5%	97.5%
THC	N	890	1007
	%	46.9%	53.1%
Barbiturate	N	13	1884
	%	0.7%	99.3%
Benzodiazepine	N	102	1795
	%	5.4%	94.6%
Cocaine	N	4	1893
	%	0.2%	99.8%
Methadone	N	12	1885
	%	0.6%	99.4%
TCA	N	163	1734
	%	8.6%	91.4%
TRMA	N	71	1826
	%	3.7%	96.3%

The test results for cocaine demonstrate that only 0.2% of the samples tested positive, with the remaining 99.8% yielding negative results. This suggests that cocaine use among the tested individuals

is exceptionally rare. In a similar vein, the results for TRMA (Tramadol or a related substance) reveal that 3.7% of the samples tested positive, while 96.3% were negative. This indicates a relatively low, yet significant, prevalence of TRMA use among the tested population.

The distribution of patients across various hospital departments exhibited notable variability. The Outpatient Department (O.P.D) accounted for the largest proportion of patients at 38.4%, followed by Male Section A (M.S.A) at 32.5%, and Male Section B (M.S.B) at 25.6%. Other departments, such as Male Section A2 (Security Department) (M.S.A2), Female Section A (F.S.A), and Male Section D (Ability Department), represented smaller percentages, ranging from 2.5% to 0.1% as presented in Figure 3.

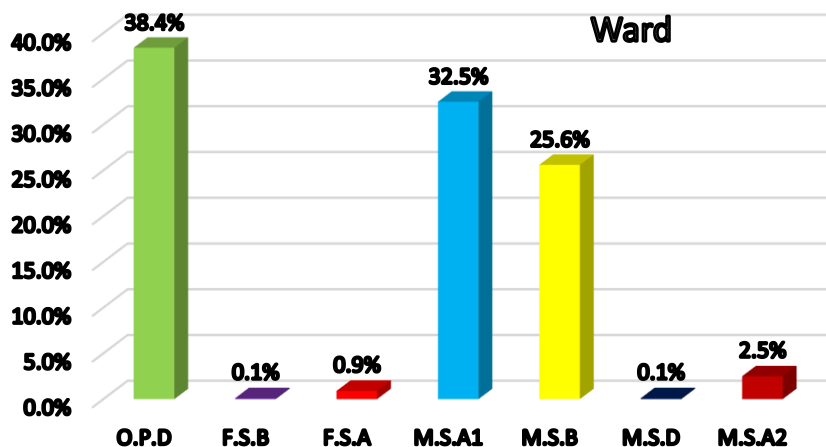


Figure 3: Depicts the distribution of patients across hospital departments, with each department color-coded for clarity (green for O.P.D, yellow, red, blue, purple for various sections, and dark red for F.S.B).

These findings offer valuable insights into the demographic characteristics, patient admission patterns, drug usage trends, and departmental distribution at Dr. Ali Al-Ruwai'i Hospital during the study period.

Discussion

The findings of the present study offer significant insights into the prevalence and patterns of substance abuse among patients admitted to Dr. Ali Al-Ruwai'i Hospital for Psychiatric and Neurological Diseases in Benghazi, Libya, between March 2022 and September 2023. With a sample size of 1,897 patients, the study highlighted a stark gender disparity, with males constituting 99.4% of the sample and females accounting for only 0.6%. This gender imbalance is consistent with prior research, which suggests a higher prevalence of substance abuse among males compared to females [17]. In the context of rising drug overdose deaths, particularly in the United States, the importance of effective surveillance methods for identifying emerging drug use patterns cannot be overstated. Urine drug testing (UDT) is a crucial, though often underutilized, tool that can significantly enhance surveillance efforts by providing timely and reliable data collection [18]. However, it is important to recognize the limitations of UDT in detecting current drug use, as it generally provides a snapshot of substance use within a relatively short detection window [19].

The study also revealed distinct differences in substance use patterns between genders, with males showing higher usage rates of substances such as amphetamines. Additionally, urban areas and individuals within the 21-40 age range were found to have higher rates of substance abuse. Cannabis emerged as the most commonly used drug, followed by cocaine, alcohol, amphetamines, and benzodiazepines, with varying prevalence across the patient population [20]. In conclusion, this study provides valuable insights into the substance abuse trends among psychiatric and neurological patients in Benghazi. It underscores the need for targeted interventions, enhanced surveillance efforts, and preventive strategies to address substance abuse effectively within this vulnerable population.

Conclusion

Drug addiction has emerged as a critical public health challenge, with treatment approaches tailored to the specific substances used and any co-occurring medical or mental health disorders. Blood, urine, or other laboratory tests play a pivotal role in assessing the use of drugs and psychiatric medications, offering valuable data for monitoring treatment progress and recovery. This study aimed to evaluate the prevalence of psychiatric and addictive medications in the urine samples of patients receiving treatment, taking into account factors such as gender differences, timing of urine drug testing, hospital departments, and the rate of patient admissions. The research was conducted at the Hospital for Psychiatric and Neurological Diseases in Benghazi, Libya, and involved the analysis of medical records for 1,897 hospitalized patients from March 2022 to September 2023. The medications assessed in the urine samples included amphetamines, tetrahydrocannabinol (THC), cocaine, benzodiazepines, methadone, tricyclic antidepressants (TCA), proteolytic enzyme complex (TRMA), and barbiturates. The findings from this study provide essential insights into the prevalence of these substances among hospitalized patients, contributing to a deeper understanding of substance use patterns within this population. The results underscore the importance of regular monitoring, early intervention, and tailored treatment strategies to address drug addiction effectively and improve patient outcomes.

Recommendations

- **Enhance Awareness:** Develop educational programs and workshops targeting healthcare providers, patients, and the general public to raise awareness about the risks and consequences associated with the misuse and toxicity of psychiatric and addictive medications. This will foster a better understanding of the potential harms and encourage responsible use of such substances.
- **Strengthen Monitoring Systems:** Implement regular monitoring and surveillance systems within healthcare settings to track prescribing practices, detect potential cases of medication misuse, and intervene proactively to prevent adverse outcomes. This will enable early identification and timely intervention, ultimately improving patient safety.
- **Improve Access to Treatment:** Expand access to comprehensive addiction treatment services, including counseling, medication-assisted therapy, and psychiatric care, to provide robust support for individuals battling substance use disorders. Ensuring adequate availability of these services will enhance recovery outcomes and reduce relapse rates.
- **Promote Interdisciplinary Collaboration:** Foster collaboration among healthcare professionals, including psychiatrists, addiction specialists, primary care physicians, and pharmacists. A coordinated, interdisciplinary approach to patient care will ensure that those affected by psychiatric and addictive medication misuse receive comprehensive, well-rounded treatment.
- **Enhance Regulatory Measures:** Strengthen regulatory frameworks to control the availability and distribution of addictive medications. Implementing prescription drug monitoring programs and enforcing stricter prescribing guidelines for controlled substances will help mitigate the risks of misuse and improve patient safety.
- **Provide Support for Research:** Allocate resources to support further research into the underlying factors contributing to psychiatric and addictive medication misuse and toxicity. Studies should focus on sociodemographic determinants, comorbidities, and treatment outcomes to inform evidence-based interventions and shape future policy development.

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