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Prevalence and Associated Factors of Tobacco, Cannabis, and Alcohol Abuse Among Refugees in Dubba Province, Dongola State, Sudan: A Cross-Sectional Study

1*Dr. Mutasim Hasabalbagi Mansour, 2Dr. Nada Ahmed Alshafi

1MSc in Public Health, Fellowship in Community Medicine, University of Malaya – Centre for Addiction Sciences, 50603 Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur, Malaysia

2MD (SMSB), Sudan Medical Specialization Board, HGXJ+945, Al Khartoum, Sudan.

Corresponding Author Email: mut_maiada@hotmail.com

Abstract
Background:
Substance abuse, particularly involving tobacco, cannabis, and alcohol, is a growing public health concern among refugee populations due to trauma, displacement, and limited access to healthcare. In Sudan, little is known about the patterns and determinants of substance use among refugees.
Objectives:
To determine the prevalence of tobacco, cannabis, and alcohol use among refugees in Dubba Province, Dongola State, Sudan, and to identify associated socio-demographic factors, reasons for use, and willingness to seek treatment.
Methods:
A cross-sectional study was conducted over six months (June–December 2024) in refugee camps in Dubba Province. A systematically selected sample of 444 refugees was drawn from an estimated population of 25,000. Data were collected using a standardized, WHO-adapted self-administered questionnaire covering sociodemographic information and substance use behaviors. Descriptive statistics and Chi-square tests were used to analyze the data, with significance set at p<0.05.
Results:
Tobacco use was reported by 87.8% of participants, alcohol by 46.8%, and cannabis by 22.3%. Tobacco use showed marginal association with sex (p=0.056), while alcohol use was significantly associated with marital status (p=0.001). Cannabis use showed no significant demographic associations. The most common reasons for use were boredom (39.6%) and experimentation (30.7%). Notably, 88.3% of current users expressed a desire for treatment. Co-use of substances was significant: tobacco and alcohol (p<0.001), tobacco and cannabis (p=0.002), and cannabis and alcohol (p<0.001).
Conclusion:
Substance use is highly prevalent among refugees in Dubba Province, driven by psychological and environmental stressors. Integrated prevention and treatment strategies are urgently needed in refugee settings.

Keywords: Substance abuse, Refugees, Tobacco, Cannabis, Alcohol, Sudan, Public health, Addiction

1. Introduction

Substance abuse is still one of the world's most serious public health issues, specifically in low- and middle-income nations (Abdelraouf et al., 2024). Among displaced populations, such as refugees, the risk of substance use is significantly heightened due to prolonged exposure to traumatic events, unstable living conditions, and limited access to healthcare and social support systems. Refugees often face psychological stressors, including post-traumatic stress disorder (PTSD), depression, and anxiety factors that can lead to the misuse of substances such as tobacco, cannabis, and alcohol as coping mechanisms (NIDA, 2024; Vasic et al., 2021).

Sudan has a long history of political instability and internal displacement, with Dongola State, specifically Dubba Province, hosting large numbers of refugees living in camp settings under difficult conditions. Despite this, there is a dearth of research on substance abuse patterns in these vulnerable populations. Globally, tobacco remains a leading cause of preventable morbidity and mortality (Samet, 2013). The incidence of tobacco use has decreased by 27.2%, although it is still a major global health problem (Dai et al., 2022). In 2020, the prevalence of smoking in the general population was 32.6% for males and 6.5% for women (Abdelraouf et al., 2024). Alcohol consumption contributes to various health risks, including liver disease, mental disorders, and social dysfunction. In comparison to other World Health Organization (WHO) areas, Africa had the lowest rate of smoking in 2020, at 18.5% (World Health Organization (WHO), 2021). Likewise, the Middle East and North Africa (MENA) area has a 19.2% incidence rate (Abdelraouf et al., 2024; Bank). The average prevalence of tobacco among the general public in Sudan is 9.6% (Abdelraouf et al., 2024; Nur et al., 2021).

Sudan has a long history of substance abuse, particularly with regard to locally made narcotics and alcohol, which dates back a long period of time. Certain groups in Sudan have been using locally grown cannabis and locally produced alcoholic drinks as their primary drugs for a number of decades (El Mahi, 2018). Despite being prohibited by Sharia law since 1983, alcohol is still consumed illegally. Locally produced alcoholic beverages include araki, a potent distilled beverage made from dates and fruits that is surreptitiously consumed, and mariesa, a low-alcohol, beer-like beverage created from fermented grains that is socially acceptable in various cultural groups during festivals.

Cannabis use, although legal in some countries, is associated with cognitive, emotional, and social impairments. In many areas, cannabis, sometimes referred to as bangu or hashish, is illegally produced as a cash crop, which further complicates the socioeconomic situation (El

Mahi, 2018). Approximately 10% of the 193 million cannabis consumers worldwide suffer from cannabis use disorder (CUD), an unrecognized concern associated with cannabis usage (Connor et al., 2021).

In the context of Dubba Province, refugees are often left without proper mental health or addiction services. Boredom, isolation, and peer pressure further contribute to a high risk of substance misuse. There is an urgent need to understand the extent of this issue in order to design effective public health responses. There is a dearth of research on the combined usage of alcohol, cannabis, and tobacco in Sudan, particularly among refugee groups, despite earlier studies looking at these drugs independently. No research has examined the incidence of alcohol, cannabis, and tobacco usage among refugees in Dongola State, especially in Dubba Province, and the factors that contribute to it in detail. This study aims to address this gap by determining the prevalence and identifying the associated factors of tobacco, cannabis, and alcohol abuse among refugees residing in Dubba Province, Dongola State, Sudan.

The findings will support policymakers and humanitarian organizations in crafting evidence-based strategies to reduce substance abuse and improve the well-being of refugees in Sudan.

2. Materials and Methods

2.1. Study Design and Setting

This cross-sectional study was performed in refugee camps located in Dubba province, Dongola State, northern Sudan, over a six-month period from June 2024 to December 2024. This study adhered to the ethical principles outlined in the Declaration of Helsinki and followed the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines for the reporting of cross-sectional studies to ensure transparency, accuracy, and methodological rigor. Prior to data collection, written informed consent was obtained from all participants.

2.2. Study Population

The target population consisted of refugees residing in the refugee camps of Dubba Province. Inclusion criteria included individuals of any gender and age who were permanent residents of the refugee camps and were willing to participate in the study. Refugees who were absent during the data collection period were excluded.

2.3. Inclusion and Exclusion Criteria

Both male and female refugees of all ages residing in the camps at the time of data collection, and who were willing to participate, were enrolled into the study. Refugees not available for data collection and those who refused to participate were excluded.

2.4. Sample Size and Sampling Technique

A sample of 444 was selected using systematic random sampling from the estimated refugee population of 25,000. The sample size was estimated in order to get a true representation of the refugee population in the camp. The sampling interval was determined at 56, and a random starting point was selected using a lottery method. Every 56th individual on the list was selected until the required sample size was reached. The final sample size included a 10% boost to account for non-responses and those who were not accessible to provide sufficient power to determine statistically significant results.

2.5. Data Collection

Data was gathered through a standardized self-administered questionnaire adapted from the WHO Students' Drug Use Survey, previously tested in the local context. The questionnaire consisted of two main sections. The first part consisted of sociodemographic questions including age, gender, marital status, religion, and origin. The second segment included the patterns of substance use, where data on past and present use of tobacco, alcohol, and cannabis, duration and frequency of consumption, purpose of use, and treatment willingness among participants were noted. The questionnaires were distributed to the selected participants, and their responses were carefully recorded for subsequent analysis.

2.6. Data Analysis

IBM-SPSS software for Windows version 27.0 (IBM©, Armonk, NY, USA) was used to perform statistical analysis. Descriptive statistics were applied to summarize sociodemographic characteristics and the prevalence of substance use. Chi-square tests were done to examine the association between sociodemographic variables and substance use. A p-value of less than 0.05 was considered statistically significant.

2.7. Ethical Approval

Ethical approval was obtained from the Ethical and Technical Committee of local authorities in Dubba Province. Written informed consent was obtained from all participants. Data were

anonymized, and participation was voluntary with the right to withdraw at any time. No personal identifiers were used in data storage or analysis.

3. Results

3.1. Prevalence of Substance Use and Demographic Characteristics

The study, conducted among 444 refugees in Dubba province, Dongla state, examined the prevalence and associated factors of tobacco, alcohol, and Cannabis use (Table 1). A high prevalence of tobacco usage among refugees (87.8%) was observed, while alcohol consumption (46.8%) and cannabis use (22.3%) were less common. This finding suggests that tobacco consumption is widespread among the refugee population in the study area. The study population was predominantly male (96.8%) and over 22 years old (84.7%). This significant gender disparity likely reflects the demographic makeup of the refugee population in the study area, where males may constitute a larger proportion of the population, possibly due to migration patterns or other socio-political factors.

Table 1. Prevalence of Substance Use and Demographics Among Refugees

Variable	Category	Frequency	Percent (%)
Current Tobacco Use	Yes	390	87.8
	No	54	12.2
Alcohol Consumption	Yes	208	46.8
	No	236	53.2
Cannabis Use	Yes	99	22.3
	No	345	77.7
Age Distribution	Less than 18	30	6.8
	18 – 22	38	8.6
	More than 22	376	84.7
Sex Distribution	Male	430	96.8
	Female	14	3.2

3.2. Association of Substance Use with Demographic Variables

The associations between demographic variables and substance use patterns (tobacco, alcohol, and cannabis) among the refugee population were examined using Chi-square tests. The findings are summarized in Table 2. A marginally significant association was found between

tobacco use and sex (p = 0.056), suggesting higher usage among males. No significant associations were found between tobacco use and age, religion, marital status, or place of origin.

Regarding alcohol consumption, a significant association was found with marital status (p = 0.001), where currently married individuals were more likely to consume alcohol. A marginal association was also observed with sex (p = 0.053), indicating that males were more likely to consume alcohol than females. However, age, religion, and place of origin did not show significant associations.

For cannabis use, none of the demographic variables showed statistically significant associations. While the association between place of origin and cannabis use (p = 0.152) had the highest Chi-square value, it did not meet the threshold for significance. These findings suggest that sex and marital status are more closely associated with substance use patterns, particularly tobacco and alcohol.

Table 2. Association Between Demographic Factors and Substance Use (N = 444)

Demographic Variable	Category	Tobacco Use (P, χ^2)	Alcohol Use (P, χ^2)	Cannabis Use (P, χ^2)
Sex	Male	0.056, 3.644	0.053, 3.651	0.464, 0.536
	Female			
Age Group	Less than 18	0.934, 0.134	0.092, 4.781	0.327, 2.234
	18 – 22			
	More than 22			
Religion	Islamic	0.359, 0.842	0.327, 0.960	0.739, 0.111
	Christianity			
Marital Status	Married	0.306, 2.366	0.001, 15.185	0.260, 2.693
	Single			
	Divorced			
Place of Origin	North Sudan	0.971, 1.312	0.903, 2.171	0.152, 9.409
	West Sudan			
	Khartoum			

	Aljazira			
	Kordofan			
	White Nile			
	South Sudan			

3.3. Reasons for Tobacco, Alcohol, and Cannabis Use Among Refugees in Dubba Province

Table 3 summarizes the reported reasons for the current and past use of tobacco, alcohol, and cannabis among the refugee population in Dubba Province. The most common reported reason for current use was "emptiness and boredom" (115 respondents, 39.6%), followed by "experimentation or curiosity" (88 respondents, 30.7%). Other frequent motivations included "temptation from friends" (26.1%) and "psychological and social problems" (19.3%). Less common reasons were "temptation from family" (6.2%), "others" (10%), and "staying awake to study or increase activity" (2.4%). Notably, there was no statistically significant difference between current and past substance use reasons, as indicated by a p-value of 0.772 and a $\chi^2 = 3.286$. This suggests that the underlying motivations for substance use remain relatively stable over time, regardless of whether the use is ongoing or historical.

Table 3. Reasons for Tobacco, Alcohol, and Cannabis Use Among Refugees in Dubba Province

Reason for Use	Current Use	Use in Past
Experimentation or curiosity	88	3
Psychological and social problems	55	0
Emptiness and boredom	115	3
Staying awake to study or increase activity	7	0
Temptation from friends	74	2
Temptation from family	18	0
Others	29	0

3.4. Desire for Treatment

The results in Table 4 show that a significant majority of current users (339, 88.3%) expressed a desire for treatment in case of addiction or complications, while only 6 (1.6%) of past users indicated the same. The data further reveals that 45 current users (11.7%) did not desire treatment, compared to 2 past users (0.5%). The p-value of 0.252, $\chi^2 = 1.310$, suggests no statistically significant difference between current and past users in their desire for treatment, and the chi-square value of 1.310 further supports this conclusion.

Table 4. Desire for Treatment in Case of Addiction or Complications

Desire for Treatment	Current Use (n)	Current Use (%)	Use in Past (n)	Use in Past (%)
Yes	339	88.3%	6	1.6%
No	45	11.7%	2	0.5%

4. Discussion

Drug abuse among refugees is a serious public health issue, particularly in low- and middle-income countries. In spite of cultural and religious bans, alcohol and cannabis produced locally are widespread, adding considerable public health problems. Tobacco, alcohol, and cannabis are three of the world's most frequently abused drugs globally, with important health and social implications. However, the literature related to the prevalence and factors of substance use among refugees in Dubba Province in northern Sudan is scant. Therefore, this research was performed to examine the prevalence and associated demographic factors of tobacco, alcohol, and cannabis consumption among refugees in Dubba Province, Dongola State, Sudan.

This study reveals high rates of substance use among refugees in Dubba Province. A study conducted in Ethiopia found a low tobacco use prevalence of 2.4% among students (Hirpa et al., 2023), while a study conducted in Tehran revealed a high prevalence of 19.8% among smokers, influenced by psychological stress, poor living conditions, and male dominance (Haghdoost and Moosazadeh, 2013). The difficult living conditions faced by refugees, including forced displacement, psychological trauma, and a lack of recreational activities, appear to contribute significantly to the widespread smoking habit. Additionally, the predominance of males in the sample (96.8%) may partially explain the high rates, as multiple

studies have indicated that men are more likely to use tobacco than women (Allen et al., 2016; Chinwong et al., 2018; Patten et al., 2019; Syamlal et al., 2014).

In addition, the present study also found a 46.8% alcohol consumption rate, similar to the rates reported in Turkey (46.3%) (Coşkun et al., 2013), however, this rate was higher than in Tanzania (17.2%) (Mbatia et al., 2009) and lower than in Virginia (57.5) (Coughenour et al., 2021). Alcohol use was significantly associated with marital status, with high usage by married people. This variation may be due to the unique stressors faced by refugee populations. Furthermore, Cannabis use was indicated by 22.3% of the respondents higher than reported in other studies such as 2.3% (Hirpa et al., 2023) and 3.8% in Ethiopian and Tehran (Hamdieh et al., 2011). The high rate seems to be associated with local accessibility, peer pressure, and boredom, as observed in Letal's study among Nigerian students (Adelekan et al., 1993). In addition to social and environmental factors, research has shown that cannabis use may be linked to elevated levels of psychoticism or psychotic liability, indicating potential adverse psychological effects for heavy users (Afkham Ebrahimi et al., 2005). This finding reinforces concerns about the long-term mental health impact of widespread cannabis consumption in refugee populations facing chronic stress and instability

Furthermore, while a study by Abdelraouf et al. identified stress (39%) and peer pressure (24%) as the leading reasons for smoking, the present study found "emptiness and boredom" (39.6%), followed by curiosity (30.7%), and peer influence (26.1%) as the main drivers of substance use (Abdelraouf et al., 2024). In line with the literature review by Hala et al., which emphasized that displacement, trauma, and disrupted social networks increase vulnerability to substance use (Elgoni and Mohammed, 2021), the findings of the present study also observed that psychosocial instability is a critical risk factor among refugees. Despite increased tobacco and alcohol consumption rates, the majority of participants demonstrated robust readiness to obtain treatment—85.4% of tobacco smokers and 91.8% of alcohol drinkers reported their readiness for rehabilitation. The results are in accordance with global trends as reflected in a study by Peacock et al., highlighting necessity for specific interventions, major deterrents like expense, stigma, and restricted health care access present actual treatment usage among refugees (Peacock et al., 2018).

The findings of this study revealed no significant association between substance use and factors such as age, religion, or geographic origin, with the exception of alcohol consumption, which

was linked to marital status. This contradicts Anteneh Meseli's study in Ethiopia, which identified male gender, family history of addiction, and social influences as key predictors of drug use (Birhanu et al., 2014). Similarly, Koşkun Bakar's research in Turkey indicated that higher household income and being male were strong determinants of alcohol and drug consumption (Coşkun et al., 2013). In line with these findings, a study conducted among Iranian university students identified being male, unmarried, academically underperforming, having more peers, and smoking (regular or sporadic) as significant risk factors for addiction susceptibility, while protective factors included higher academic achievement and maternal employment indirectly reducing susceptibility (Zeinali, 2014). The absence of these associations in the current study may reflect the relatively uniform socioeconomic conditions among refugees, who share common struggles related to displacement and hardship.

This study further observed that 84.7% of participants were over 22 years old, while only 6.8% were under 18, and 8.6% fell within the 18-22 age range. This distribution differs from studies like Herpa et al, which focused on school-aged students, where substance use patterns vary due to developmental and social factors (Hirpa et al., 2023). Furthermore, research by Compton et al. indicated that the COVID-19 pandemic led to a decline in drug use among younger populations, highlighting the influence of age on substance consumption (Compton et al., 2023). The older age distribution in this study may help explain the high rates of tobacco and alcohol use, as older individuals are more likely to develop established consumption habits.

These results underscore the need for immediate public health interventions specific to the unique challenges faced by Sudanese refugee communities. The high prevalence of tobacco and alcohol use, and the emergence of increasing cannabis use, have serious implications for long-term physical and mental health consequences such as respiratory disease, liver disease, substance dependence, and social dysfunction. Because most of these substances are used clandestinely because of legal and cultural restrictions, their consumers are also susceptible to unsafe consumption behavior as well as social exclusion

The strong correlation between alcohol use and marriage status, and the marginal connections between drug use and sexual activity, highlight the need to integrate demographic sensitivities into prevention program design. Furthermore, the important role of "emptiness and boredom" as a motivation for use identifies the absence of significant engagement, education, and work opportunities within the camps. Rectifying these structural weaknesses could have a substantial impact on reducing substance dependence as a means of coping.

Substance use among refugees in Dubba Province is widespread and driven by social, emotional, and environmental stressors. Tobacco, alcohol, and cannabis use are prevalent, with significant behavioral overlap. Despite these challenges, most users show a willingness to seek treatment. Coordinated and accessible intervention strategies are essential to address this issue. Some of the main strengths of this study are its use of a large, systematically selected sample and a standardized, WHO-based questionnaire that enhances the reliability of the data. The study also represents one of the first efforts to examine the prevalence and associated factors of tobacco, alcohol, and cannabis use among refugees in Dongola State, offering valuable insight into an under-researched population. The inclusion of three commonly used substances allows for a broader understanding of substance use behavior in this setting.

Regarding the limitations, the study relied on self-reported responses, which may be influenced by memory bias or social desirability, particularly for substances that are culturally or legally sensitive. The very small number of female participants could limit the generalizability of the findings across genders. Finally, the cross-sectional design restricts the ability to draw causal conclusions about the relationship between demographic characteristics and substance use patterns.

Statements and Declarations

Availability of data and materials

Not applicable.

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Competing Interests

The authors have no competing interests to declare that are relevant to the content of this article.

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