Prevalence and Use of Cannabis Among Male Smokers in Zawia City, Libya: A Cross-Sectional Study

Shokri Ayad Halila[1]

[1]University of Zawia - Faculty of Education Zawia - Department of Biology. Zawia, Libya
Department of Biology, Faculty of Education Zawia, University of Zawia. Zawia, Libya
Correspondence TO Shokri Halila, Department of Biology, Faculty of Education Zawia, University of Zawia. Zawia, Libya.
ORCID: https://orcid.org/0009-0005-4146-0403

Abstract: Background: Cannabis is widely used globally, yet data on its prevalence among male smokers in Libya are scarce. Aims: This study aimed to assess the prevalence, patterns of use, and accessibility of cannabis among male smokers in Zawia, Libya. Methods: A cross-sectional survey of 100 male smokers was conducted using a structured questionnaire covering demographics, smoking behaviours, and cannabis (hashish) use. Adjusted prevalence estimates were calculated to account for potential underreporting. Results: Self-reported cannabis use was 25% for past use and 3% for current use. After adjustment, estimated prevalence rose to 35–45% for past use and 18–24% for current use. High availability was reported, with 97% of participants noting abundant tobacco shops, 95% cannabis sales points, and 73% reporting easy access. No significant associations were found between cannabis use and demographic or behavioral factors. Conclusion: Cannabis experimentation is common among male smokers in Zawia, with estimated prevalence higher than self-reported rates. High availability may facilitate use. These findings highlight the urgent need for public health interventions, awareness programs, and policies to reduce cannabis use and its related risks in Libya.

Keywords: Cannabis, Male Smokers, Prevalence, Public Health, Libya.

I. INTRODUCTION

Cannabis (Cannabis sativa L.) is a plant belonging to the family Cannabaceae and is considered one of the oldest medicinal plants known worldwide (1). It has been utilized for thousands of years for recreational, medicinal, and religious purposes, particularly in the Indian Himalayas and various Asian and African countries such as China, Pakistan, Nepal, Bhutan, Afghanistan, Morocco, and Iran(2). Historically, Cannabis sativa was cultivated since the Neolithic period primarily for fibre production, and later gained importance as a source of food and traditional medicine, Depending on its use and chemical composition, the plant is often referred to as hemp or marijuana (3). Figure 1 show cannabis (hashish).

Cannabis contains a complex mixture of chemical compounds, including over 100 cannabinoids, such as tetrahydrocannabinol (THC) and cannabidiol (CBD), along with terpenes, phenols, fatty acids, amino acids, flavonoids, sugars, hydrocarbons, and other phytochemicals(1,4,5). These compounds are produced through secondary metabolism and their concentrations vary according to subspecies, plant age, harvest time, and growing conditions (1). Among these compounds, Δ9-THC is the primary psychoactive constituent, while other cannabinoids have demonstrated therapeutic potential in alleviating chronic pain, reducing inflammation, and managing depression (6). Recent pharmacological studies have also highlighted the potential role of cannabinoids in neuroprotection and mental health improvement (7).

In recent decades, cannabis has attracted global attention not only as an illicit substance but also as a potential source of modern medicines (1). Its pharmacological properties have been extensively reviewed, highlighting potential applications in treating microbial infections and cancer (6). Despite its benefits, cannabis is among the most widely used psychoactive substances worldwide. Approximately 4.3% of the global adult population has used

cannabis at least once in their lifetime(8), and around 43% of high school students in the United States have reported using cannabis at some point(9). Globally, the World Health Organization estimates that over 147 million people, representing more than 2.5% of the global population, consume cannabis (10).

Cannabis production is geographically concentrated. Afghanistan is the world's largest producer, accounting for about 80% of global production with an estimated annual output of 1,500–3,500 tons. Morocco follows as the second-largest producer, producing around 1,000 tons annually, while countries such as Lebanon also contribute significant quantities (11). The economic significance of cannabis trade remains substantial in these regions.

Cannabis use, particularly smoking, has been linked to various health effects. It can cause respiratory problems such as chronic bronchitis, airflow obstruction, and impaired lung function, and has been associated with an increased risk of lung cancer (12). Furthermore, cannabis affects the central nervous system, potentially leading to memory and concentration impairments, mood disturbances, and cognitive deficits. It may also weaken the immune system, increasing susceptibility to infectious diseases (12, 13). Cardiovascular risks, including heart attacks and strokes, have also been reported among cannabis users (14).

The legal and social status of cannabis varies worldwide. While some countries have legalized cannabis for medical or recreational use, many, particularly in the Middle East and North Africa, maintain strict prohibitions. In Libya, for instance, the cultivation, sale, and use of narcotic substances including hashish are criminalized, with penalties ranging from fines to life imprisonment or the death penalty for trafficking(15, 16).

Given its widespread use, complex chemical composition, and evolving legal status, understanding the prevalence, patterns of use, and health impacts of cannabis is crucial. Careful evaluation of these factors is essential for informing evidence-based public health policies, guiding interventions, and balancing individual rights with societal well-being (10).

➢ *Importance*
The scarcity of studies on the prevalence and use of Cannabis (Hashish) in Libya, particularly in the city of Zawia, highlights the urgent need for research to provide critical insights that can inform evidence-based public health policies. This study aims to bridge the existing knowledge gap, enhance understanding of the factors contributing to the prevalence and use of Cannabis (Hashish), and support the development of effective public health strategies to reduce its consumption, considering its prohibition under religious and international regulations.

➢ *Objective*
The specific objectives of this study are:
- To assess the prevalence of Cannabis (Hashish) in the city of Zawia and examine the mechanisms of its spread and distribution.
- To evaluate the patterns of Cannabis (Hashish) use among smokers, including both current and past users.

II. METHODOLOGY

➢ *Study Design and Sample:*
This study employed a descriptive cross-sectional design using a survey approach, which is appropriate for assessing the prevalence and use of Cannabis (Hashish) among smokers in Zawia, Libya. The study population comprised male smokers aged 20 years and above. A total of 100 participants were selected using a random sampling technique to ensure representativeness of the target population.

The sample size was estimated using Thompson's formula (Thompson, 1992) with a margin of error of 0.05, a 95% confidence level (Z-value = 1.96), and an expected population proportion of 0.5. Based on these criteria, the estimated number of male smokers in the population was approximately 41,625. This calculation justified the selection of 100 participants for this descriptive survey.

➢ *Instruments:*
Data were collected using a self-administered structured questionnaire, designed to ensure clarity, simplicity, and confidentiality, given the sensitive nature of the subject. The questionnaire consisted of three main sections:
- Demographic and Social Characteristics: Age, educational level, occupation, and monthly income.
- Smoking Behaviours: Initiation of smoking, influence of family members, daily smoking quantity, use of electronic cigarettes and shisha, previous attempts to quit, and the impact of psychological and social pressures on smoking behaviours.
- Cannabis (Hashish) Use and Availability: Current or past use of Cannabis (Hashish), availability of shops selling Cannabis, and mechanisms for obtaining Cannabis.

The questionnaire was pre-tested for clarity and validity before deployment.

➢ *Data Analysis:*
Data were analysed using IBM SPSS version 25. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were calculated to summarise the demographic profile and behavioural characteristics of the sample. Correlation analyses were conducted to examine relationships between variables. Given the sample size, the analysis focused primarily on descriptive and exploratory statistics to identify trends and patterns. Statistical significance was set at $p < 0.05$.

➤ *Use of Artificial Intelligence Tools*

   Artificial intelligence tools, including Meta AI and ChatGPT, were utilised during the research process to assist in the preparation, organisation, and refinement of the research content, ensuring accuracy, consistency, and efficiency throughout the study.

➤ *Ethical Considerations:*

   The study was conducted in accordance with the Declaration of Helsinki and relevant institutional guidelines. Participation was voluntary, and the confidentiality and privacy of all participants were strictly maintained.

Participants were fully informed about the purpose, scope, and procedures of the study, and written informed consent was obtained prior to participation. All collected data were securely stored and analysed while preserving anonymity. Participants were assured of their right to withdraw from the study at any time without any consequences.

III. RESULTS

A. Results of Axis 1
   Demographic and Social Characteristics

Table 1 Shows the Results of Demographic and Social Characteristics

Variable	N	Mean	Std. Deviation	Range	Minimum	Maximum
Age	100	41.18	10.41	52	20	72
Educational Level	100	1.50	0.64	2	1	3
Job	100	1.11	0.31	1	1	2
Monthly Income	100	248.75	99.71	375	125	500

➤ *Age*

   The participants' ages ranged between 20 and 72 years, with a mean age of 41.18 years and a standard deviation of 10.41 years. The most common age category was 40–50 years, representing 41% of the study population. This finding is consistent with more recent evidence showing that cannabis use is more prevalent among middle-aged and older adults (17).

➤ *Educational Level*

   A total of 58% of the participants had completed secondary education, 34% held a bachelor's degree, and only 8% had postgraduate degrees (master's or doctoral). These results show that Cannabis (Hashish) use is observed among individuals with different levels of education.

➤ *Job*

   The majority of the participants (89%) were employed, whereas 11% were self-employed. This suggests that Cannabis (Hashish) use is distributed across different employment categories.

➤ *Monthly Income*

   The average monthly income of the participants was \$248.75 with a standard deviation of \$99.71. Almost half of the participants (49%) earned between \$250 and \$375 per month. These findings indicate that Cannabis (Hashish) use occurs among individuals from various economic backgrounds.

Note: Tables are in Appendix A.

B. Results of Axis 2
   Smoking Behaviours

Table 2 Shows the Results of Smoking Behaviours

Variable	N	Mean	SD	Range	Min	Max
Age of Initiation	100	21.1	5.1	30	10	40
Place learned smoking	100	2.3	1.4	4	1	5
Father smokes	100	1.5	0.5	1	1	2
Amount of Smoke	100	2.8	1.0	3	1	4
Number of Cigarettes Smoked per Day	100	21.6	12.4	35	5	40
E-cigarette use	100	1.9	0.3	1	1	2
Waterpipe (Hookah) Use	100	1.7	0.5	1	1	2
Does current situation contribute to increased smoking	100	1.2	0.4	1	1	2
Early smoking period	100	2.5	1.0	5	1	6
Age group when learned smoking	100	2.5	1.0	5	1	6

➤ *Age of Initiation*

   The participants report starting smoking at various ages. About 12% begin between 10–15 years, 47% between 15–20 years, 24% between 20–25 years, 15% between 25–30 years, and 2% between 35–40 years. These findings indicate that adolescence and early adulthood are critical periods for smoking initiation, consistent with global evidence

suggesting that most smokers start before the age of 20 (18,19).

➤ *Place learned smoking*

   Almost half of the participants (47%) learn to smoke in school, 17% from relatives, 6% from television, 23% on their own, and 7% from neighbours. This underscores the role of social and environmental factors in smoking initiation (20).

➢ *Father Smokes*

More than half of participants (54%) have parents who smoke, while 46% do not. Parental smoking is recognized as a significant predictor of smoking behavior in offspring (21).

➢ *Number of Cigarettes Smoked per Day*

Participants report varying levels of cigarette consumption: 12% smoke 5 cigarettes per day, 20% smoke 10, 41% smoke 20, and 27% smoke 40. This suggests a predominance of moderate-to-heavy smoking among the study population.

➢ *E-Cigarette Use*

Twelve percent of participants use e-cigarettes, while 88% do not. This aligns with studies showing that e-cigarette use is increasing globally but remains lower than traditional cigarette smoking among adults (22).

➢ *Waterpipe (Hookah) Use*

Thirty percent of participants use waterpipes, whereas 70% do not. Hookah use is particularly common in the Middle East and North Africa region and is associated with similar health risks to cigarette smoking (23).

➢ *Attempting to Quit Smoking*

A majority (78%) of participants have attempted to quit smoking, while 22% have not. This indicates both awareness of health risks and the challenges of nicotine dependence (18).

➢ *Impact of Psychological or Social Pressures*

Eighty percent of participants report that psychological or social pressures increase their desire to smoke, whereas 20% do not. This emphasizes the influence of social and emotional factors on smoking behavior (24, 25).

Note: Tables are in Appendix B.

C. Results of Axis 3:
Cannabis (Hashish) Use and Availability

Table 3 Shows the Results of Cannabis (Hashish) Use and Availability

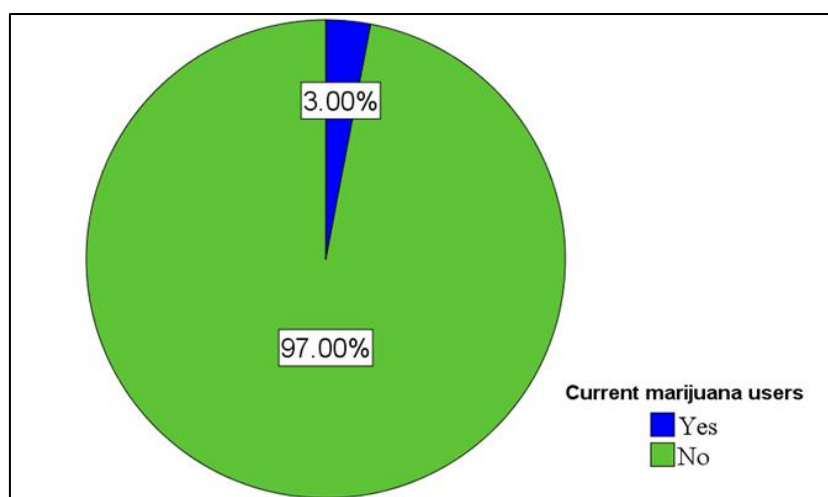| Variable	N	Mean	Std. Deviation	Range	Minimum	Maximum
Smoked Cannabis (Hashish) in the past	100	1.75	0.44	1	1	2
Currently smoke Cannabis (Hashish)	100	1.97	0.17	1	1	2
Tobacco shops are abundant	100	1.03	0.17	1	1	2
Cannabis (Hashish) sales points are abundant	100	1.05	0.22	1	1	2
Ease of buying Cannabis (Hashish)	100	1.52	0.87	2	1	3
Cannabis (Hashish) sales in the region	100	1.04	0.20	1	1	2

Fig 1 Shows the current Rate of Cannabis Smoking.
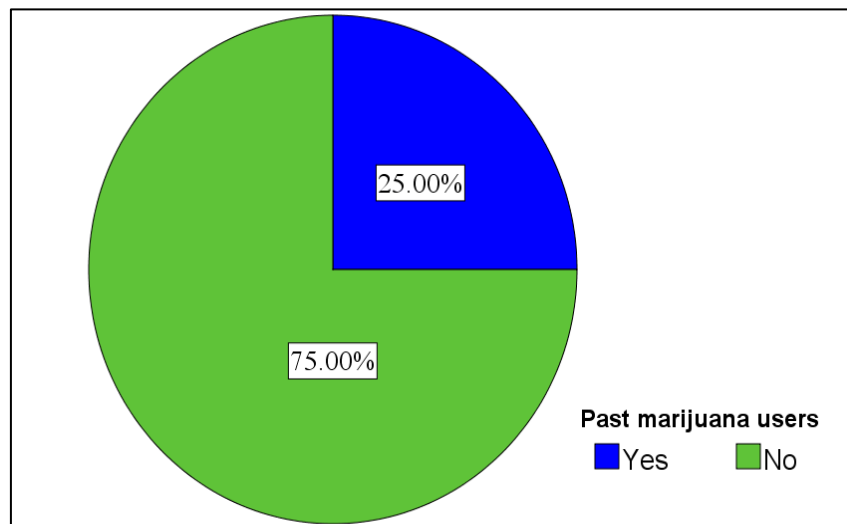
Fig 2 Shows the Percentage of Previous Cannabis Smoking.

➤ *Smoked Cannabis (Hashish) in the past*

A notable proportion of participants report past cannabis use, with 25% indicating they have smoked Cannabis (Hashish) previously. This suggests that experimentation with Cannabis (Hashish) occurs in the population but may not always continue into regular use.

➤ *Currently smoke Cannabis (Hashish)*

Only 3% of participants currently use Cannabis (Hashish), indicating a significant decline compared to past use. Logistic regression analysis shows no statistically significant association between previous cannabis use and current use (p = 0.136), with an odds ratio of 6.435 and overall classification accuracy of 76.0%.

➤ *Perceived Availability of Tobacco and Cannabis (Hashish)*

The vast majority of participants perceive tobacco shops as abundant (97%) and Cannabis (Hashish) sales points as widespread (95%), reflecting high availability of both substances in the region.

➤ *Accessibility of Cannabis (Hashish)*

Approximately 73% of participants consider it easy to purchase Cannabis (Hashish), while 25% are uncertain. These findings indicate relatively high accessibility, which may contribute to experimentation or occasional use.

➤ *Statistical Associations with Demographic Variables*

Pearson correlation analysis reveals no statistically significant correlations between Cannabis (Hashish) use and variables such as age, educational level, e-cigarette use, age of smoking initiation, and current circumstances. This suggests that Cannabis (Hashish) use may not be directly influenced by these demographic or behavioral factors.

➤ *Impact of Security Situation in Libya*

The absence of state authority and security in Libya contributes directly to the spread and abuse of Cannabis (Hashish). Political divisions, proliferation of armed groups, and external interventions create an environment conducive to drug trafficking and its negative impacts on public health

(26-28). Statistics indicate that Cannabis (Hashish) use in Libya has increased by 30% over the past five years (28), and there is a strong correlation between the lack of security and the increase in organized crime, including drug trafficking (27). Drug trafficking also affects the Libyan economy by diverting financial resources to illegal trade, worsening economic and social conditions[26]. Addressing these challenges requires strengthening state authority, restoring security, and implementing effective anti-drug policies, including awareness and education about the risks of drug use.

➤ *Estimated Proportion of Cannabis (Hashish) Use Among Smokers*

This study estimates the proportion of Cannabis (Hashish) use among smokers in Libya using survey data. In one sample, 3% of participants report current use, while in another sample of 50 smokers, 5 individuals use cannabis, indicating 10%. By applying a weighted average, the estimated proportion of Cannabis (Hashish) use among smokers is approximately 9.86%, highlighting Cannabis use as a relevant health and social issue.

➤ *Reported Prevalence of Cannabis Use Among Participants*

A structured questionnaire was administered to a sample of 100 male smokers aged 20 years and above. The reported results showed that 25% of the participants had previously used cannabis (Ever users); while 3% reported current use (Current users). The 95% confidence intervals for the reported proportions were calculated using the standard formula for the confidence interval of a proportion:

$$CI = p \pm Z \cdot \sqrt{\frac{P(1-P)}{N}}$$

Where *P* is the reported proportion, *N* is the sample size, and *Z* = 1.96 for a 95% confidence level.

Accordingly, the confidence interval for ever use ranged from 16.5% to 33.5% and for current use ranged from 0% to 6.3%.

These values represent the results that were directly reported by the participants without adjusting for potential underreporting.

➢ *Results of Personal Interviews on Hashish Prevalence in Zawia City*

The results obtained through personal interviews with a number of citizens in the city of Zawia also indicate the presence of multiple places for selling hashish (29).

Note: Tables are in Appendix C.

IV. DISCUSSION

➢ *Discussion of Axis 1: Demographic and Social Characteristics*

The cannabis industry has experienced rapid growth globally, with diverse consumption patterns across different demographic groups. In the United States, approximately 15% of adults are current users, and nearly half have tried cannabis at least once (30). Market projections suggest that the cannabis industry will reach nearly $45 billion in revenue by 2025, reflecting a growth rate of 12.1% compared to 2024 (31). Usage is prevalent across genders, with over one-third of women reporting consumption, and Generation Z and Millennials accounting for 62.8% of sales (32).

Primary motivations for cannabis use include relaxation, stress relief, and exercise recovery, with studies reporting that 14% of users consume cannabis for exercise-related purposes, and 47% experience perceived post-workout benefits (33, 34). Furthermore, the economic impact of the cannabis sector is considerable, supporting over 440,000 full-time equivalent jobs with a year-over-year increase of 5.4% (35). These factors illustrate the increasing socio-economic significance of cannabis use.

➢ *Discussion of Axis 2: Smoking Behaviours*

The findings highlight that smoking initiation occurs predominantly during adolescence and early adulthood, with social influences playing a critical role (21). Sources of learning to smoke vary and include school, relatives, media exposure, and self-initiation, underscoring the importance of environmental and social factors in smoking behaviours (20).

Patterns of cigarette and alternative tobacco use demonstrate moderate-to-heavy consumption among participants. Notably, 12% reported using e-cigarettes, and 30% reported Waterpipe (hookah) use, indicating substantial exposure to various nicotine products (22, 23). Efforts to quit smoking were reported by a majority (78%), while 80% of participants acknowledged that psychological or social pressures heightened their smoking behaviour. These findings reflect the complex interplay between addiction, cessation motivation, and socio-emotional influences (18, 24, and 25).

➢ *Discussion of Axis 3: Cannabis Smoking and Availability*

The results indicate relatively low current use of Cannabis (Hashish) (3%), while a higher proportion (25%) reported past experimentation. This discrepancy suggests that actual consumption may be underreported due to stigma or legal concerns. The observed widespread presence of tobacco shops and cannabis sales points contributes to the ease of access, potentially facilitating experimentation and occasional use.

Adjusted prevalence estimates suggest that cannabis use among smokers may exceed self-reported rates, reflecting possible underreporting in survey data. These findings underscore the influence of social, environmental, and reporting factors on cannabis consumption patterns.

➢ *Implications for Public Health and Policy*

The data highlight the necessity for targeted public health interventions and policy measures in Libya. Strategies should focus on reducing accessibility, raising awareness of the health risks, and implementing prevention programs for high-risk populations. Collaborative action among law enforcement, healthcare providers, and community stakeholders is essential to curb cannabis abuse and its associated health and social consequences.

➢ *Discussion of Personal Interviews on Hashish Use in Zawia City*

Interviews with residents of Zawia City revealed widespread availability of hashish across multiple locations, corroborating quantitative findings. These qualitative insights emphasize the urgent need for comprehensive, integrated approaches to address cannabis use. Effective strategies should combine public awareness campaigns, strengthened surveillance, law enforcement measures, and community-based interventions to mitigate prevalence and safeguard public health and safety (11).

V. CONCLUSION

- High Prevalence of Cannabis Use: Despite self-reported low current use (3%), adjusted estimates suggest a significantly higher prevalence (18–24% for current users; 35–45% for past users), indicating underreporting and highlighting cannabis use as a relevant public health concern.
- Influence of Social and Environmental Factors: Social influences, including parental smoking, peer networks, and school environments, contribute significantly to the initiation of smoking and cannabis experimentation.
- Early Initiation of Smoking:A large proportion of participants began smoking during adolescence (before age 20), suggesting early exposure as a risk factor for later cannabis use.
- High Availability and Accessibility: The widespread presence of tobacco shops and cannabis sales points (97% and 95% respectively) and reported ease of access (73%) facilitate experimentation and use among male smokers.
- Limited Awareness and Lack of Public Health Measures: Participants showed limited awareness of cannabis-related health risks, and the absence of targeted public health interventions and regulatory oversight exacerbates the issue.

FINAL REMARKS

This study provides essential insights into the prevalence, patterns, and influencing factors of Cannabis (Hashish) use among male smokers in Zawia, Libya. The findings highlight the urgent need for evidence-based public health interventions to address cannabis use and its associated risks. Recommended actions include implementing targeted awareness campaigns, enhancing educational programs in schools, strengthening law enforcement to limit access, and developing harm reduction strategies tailored to the Libyan context. These measures can help reduce cannabis consumption, protect public health, and improve community well-being.

RECOMMENDATION

- Public Awareness Campaigns: Launch educational campaigns to inform the public, especially adolescents and young adults, about the health risks of cannabis use.
- School-Based Prevention Programs: Integrate cannabis and tobacco awareness programs into school curricula to address early initiation.
- Regulation and Enforcement: Implement stricter monitoring of tobacco and cannabis sales, including penalties for illegal distribution, to reduce accessibility.
- Support and Treatment Services: Provide accessible support and treatment programs for individuals struggling with cannabis use and nicotine addiction.
- Further Research: Conduct longitudinal studies to better understand the long-term effects of cannabis use, the dynamics of underreporting, and the efficacy of intervention strategies.
- Community Engagement: Involve families and community organizations in prevention efforts, promoting healthy lifestyles and reducing social pressures that encourage substance use.

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FIGURES

Image 1 shows the Cannabis (hashish) (36).

Fig 1: Cannabis (Cannabis sativa L.), Locally Known as Hashish, Showing Characteristic Morphological Features.