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Khat Use in Persons with Mental Illness in Southwest Ethiopia: A Cross-Sectional Study

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Introduction

Khat is a natural psychoactive substance, which has been chewed for many years in Ethiopia, East Africa, and the southern Arabian Peninsula [1-3]. With the recent globalization, khat chewing has spread with African and Arabian immigrants to various Asian [4] and European [5-9] countries, and to Australia [10-12], as well as to the United States [13]. The users of khat in these new countries are predominantly immigrants from the khat chewing countries [9]. Evidence shows that fresh khat leaves contain more than 40 chemicals [15]. However, most of the stimulant effect of khat is thought to come from the chemicals cathinone, cathine, and norephedrine [14,15]. Khat users report increased levels of energy, alertness, sensations of elation, self-esteem, enhanced imaginative ability, capacity to associate ideas when using and an increase in libido [16,17]. Khat use is also associated with increased blood pressure/hypertension, development of gastrointestinal tract problems, cytotoxic effects on liver and kidneys, and keratotic lesions at the site of using [18,19].

A hospital based study in Yemen of 304 study participants stated that at least one lifetime episode of khat use was reported in 81.6% men and 43.3% women [20]. Study in the south-western Uganda documented that the consumption of khat is increasing especially among youths, with 32% had experience with chewing khat and 20% were still using it [21]. Studies showed that in Ethiopia the number of khat users has significantly increased from time to time and now it has become common in all segments of the Ethiopian population [22]. For instance, the prevalence of current khat use in community-based study in Ethiopia was 50% [23].

In general terms, there were sporadic case reports on a possible association between khat use and the occurrence of mental disorders, such as manic-like psychosis, incidence of psychotic symptoms increased with excessive use of khat and delusional disorder [24-27]. The psychiatric patients are more vulnerable populations to substance abuse when compared to the general populations. As a result, the high prevalence of substance abuse among persons with psychiatric disorders calls for more effective Substance use assessment in psychiatric settings [28].

Even though the prevalence of khat use and its physiological, social and psychological effects have been studied in diverse populations and areas of Ethiopia, there is little known about the prevalence of khat use in psychiatric outpatients and factors associated with khat use in this population. So, the current study is aimed to determine the prevalence of khat use and to identify factors associated with khat use among psychiatric outpatients. The results of this study will help health professionals, hospital administrators and policy-makers in their effort to reduce khat use among persons with mental illness by designing interventions based on the study findings.

Materials and Methods

Study area and period

A cross-sectional study was conducted in Jimma University Specialized Hospital (JUSH) which is located in the south west of Ethiopia which is 355 km far from Addis Ababa. JUSH is one of the oldest public hospitals in the country. It was established in 1937 during Italian occupation for the service of their soldiers. The hospital provides specialized health services for approximately 9,000 inpatient admissions and 80,000 outpatient attendances per year, serving a catchment population of about 15 million people. An outpatient psychiatry clinic at Jimma Hospital was established in 1988 and there are 50 patients on daily follow up services and a total of 3952 patients on follow up. In Ethiopia JUSH is one of the hospitals that have psychiatric inpatient service next to Amanuel mental Hospital and officially there are only 26 beds for inpatient services. The research was conducted in August, 2013.

Inclusion criteria

All adult psychiatric outpatients were included.

Sample size and sampling technique

An institution based cross-sectional study was implemented. The sample size was determined using single population proportion formula with the assumption of 95% confidence level, 5% marginal error, 10% non-response rate and the proportion of khat use to be 50%. The weekly patient load in the outpatient department of psychiatry clinic was 250. Therefore, to get the sample size of 385, we needed to collect the data for the duration of two weeks consecutively. All patients who met the inclusion criteria coming to JUSH psychiatry clinic during the data collection period were included.

Sampling procedures

All eligible adult attendees of the psychiatric clinic at JUSH during the study period were invited consecutively to participate in the study.

Instruments

Dependent variable: Khat use: A structured questionnaire was used to assess the pattern of khat use, including frequency and the amount of khat. In this study, prevalence of current khat chewing is the proportion of patients who are chewing khat within 30 days preceding the study. A structured questionnaire was used to assess

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The data collectors and supervisors monitored data quality and checked all questionnaires for completeness. Incomplete and unclear questionnaires were returned to the data collectors for correction.

Data quality assurance: The data collectors and supervisors were trained. Data collection was carried out after the questionnaires were pretested on 5% of the total sample of psychiatric outpatients at Mizan Hospital which is 298 km away from Jimma town. The supervisor monitored data quality and checked all questionnaires for completeness. Incomplete and unclear questionnaires were returned to the data collectors for correction.

Data analysis: The dependent and explanatory variables were entered into a bivariate logistic regression analysis, one at a time, in order to estimate the strength of association using Odds Ratios (OR) by using SPSS version 20. All variables associated with khat use in the bivariate logistic regression with a p-value ≤ 0.25 were entered together by using enter method in order to control for potential confounders. Only variables with p-value lower than 0.05 in the multivariate analysis remained in the final model.

Ethical considerations
Ethical clearance and permission was obtained from the Ethical Review Committee of Jimma University, College of Public Health and Medical Sciences. The study participants were free to enroll in the study and withdraw from it at any time. All the interviews with participants were made with strict privacy after getting informed consent from the participants and assuring confidentiality. Patients with khat use were referred to mental health professional specialists and psychologists for further evaluation and management.

Results
Study participant characteristics
A total of 385 psychiatric outpatients were approached for enrolment in the study. Of the total Study sample 365 agreed to participate making the response rate 94.8%. The majority 267 (73.2%) of the respondents were males, Oromo 214 (58.6%) by ethnicity and followers of Muslim religion 196 (53.7%) followed by Orthodox Church followers 137 (37.5%). The age of the respondents mainly fall between 25-34 years 139 (38.1%). With regards to educational status, 143 (39.2%) had attended primary school at the level of grade 1 and above and 211 (57.8%) reported mean family income of less than 1201 birr. At the time of the study, 180 (49.3%) of the respondents were married followed by singles 166 (45.5%) and 201 (55.1%) of the overall respondents were unemployed. The vast majority 315 (86.3%) of them were living with their family (Table 1).

Frequency of khat use
The prevalence of current khat use was 235(64.4%) of the sample. The prevalence of khat use in Oromo and Amhara ethnicity were 74.3% and 49.3% respectively. Regarding religion 82.1% of Muslims and 48.2% of Orthodox Christians reported khat use.

Khat use and its associated factors
Khat use was present in 75.3 % (n = 201) of males and 34.7% (n = 34) of females (crude odds ratio (COR):5.73(95% CI = 3.48, 9.46)). In

| Variables | N (%) |
|-----------|-------|
| Sex       |       |
| Male      | 267(73.2) |
| Female    | 98(26.8)  |
| Age in years |   |
| 18-24     | 85(23.3)  |
| 25-34     | 139(38.1) |
| 35-44     | 89(24.4)  |
| 45-70     | 52(14.2)  |
| Ethnicity |       |
| Oromo     | 214(58.6) |
| Amhara    | 67(18.4)  |
| Gurage    | 32(8.8)   |
| Others    | 52(14.2)  |
| Religion  |       |
| Orthodox  | 137(37.5) |
| Muslim    | 196(53.7) |
| Others    | 32(8.8)   |
| Frequency of going To worship place | |
| Never     | 37(10.1)  |
| Sometimes | 220(60.3) |
| Frequently | 107(29.3) |
| Educational Status | |
| Illiterate | 56(15.3) |
| Primary   | 143(39.2) |
| Secondary | 103(26.2) |
| College/University | 63(17.3) |
| Occupation |       |
| Unemployed | 201(55.1) |
| Gov't Employed | 74(20.3) |
| Others     | 90(24.7)  |
| Mean Family monthly income | |
| ≤1201 Birr | 211(63.6) |
| >1201 Birr | 121(36.4) |
| Marital Status | |
| Single    | 166(45.5) |
| Married   | 180(49.3) |
| Others    | 19(5.2)   |
| Living arrangement | |
| Alone     | 34(9.3)   |
| With family | 315(86.3) |
| With relatives | 16(4.4) |

Table 1: Socio-economic and demographic characteristics of current khat use in persons with mental illness in Jimma University Specialized Hospital (n = 365).
the bivariate analyses, current khat use was significantly and positively associated with male gender, being a follower of Islam, frequency of going to worship place, current cigarette smoking and schizophrenia (Table 2). In the multivariate analysis by using enter method, males were six times the odds of using khat when compared to females (AOR:3.81 (95% CI= 2.96, 11.40)). The odds of individuals who were Muslims to use khat was four times higher as compared to Orthodox Christians (AOR: 4.3 (95% CI=1.54, 11.96)). The likelihood of using khat among cigarette smokers was 3 times higher when compared to non-smokers (AOR: 3.04(95% CI = 1.33, 6.94)). In the final model there was no statistically significant difference between current khat use and ethnicity, frequency of going to worship place, occupation, marital status, major depressive disorder and schizophrenia (See Table 2).

Mental illness and other substance use related characteristics of study participants

Based on patients’ medical records, the most common primary psychiatric diagnosis was schizophrenia 131 (35.9%), followed by major depressive disorder 104 (28.5%), other Psychiatric disorders mentioned were brief psychotic disorder, Postpartum psychosis, schizoaffective disorder, depressive disorder not otherwise specified totally accounting for 77 (21.1%), bipolar I disorder 45 (12.3%), and anxiety disorders 30 (8.2%). The frequency of khat use in major depressive disorder, bipolar I disorder, anxiety disorders, schizophrenia and other psychiatric disorders were 55.8%, 66.7%, 73.3%, 74% and 59.7% respectively. Khat use in persons with alcohol use disorders (67.6%), cigarette smokers (82.7%) and shisha users (80%) (Table 3).

Discussions

In this cross-sectional study among psychiatric outpatients of Jimma University Specialized Hospital, the prevalence of current khat use was 64.4%. In our study, khat use is highly prevalent in males than females. The possible explanation for the observed gender differences in khat use could be due to the cultural restrictions on the use of khat in females although a higher percentage of females with mental illness were using khat in our study.

The prevalence of khat use found in our study was higher than that found in a previous hospital based study in Jimma (23%), An institution based study in Dilla (41.8%), A School based study in Bale (48%) and an institution based study in Aksum (27.9%), Ethiopia [30-33] as well as a hospital based study done in Yemen (58.2%) [34]. This discrepancy may be due to the difference between study populations. Our study participants were recruited from outpatient psychiatry department of JUSH. Since our study participants were persons account for 77 (21.1%), bipolar I disorder 45 (12.3%), and anxiety disorders 30 (8.2%). The frequency of khat use in major depressive disorder, bipolar I disorder, anxiety disorders, schizophrenia and other psychiatric disorders were 55.8%, 66.7%, 73.3%, 74% and 59.7% respectively. Khat use in persons with alcohol use disorders (67.6%), cigarette smokers (82.7%) and shisha users (80%) (Table 3).

Table 2: Logistic regression model estimates of risk factors for current khat use in persons with mental illness in Jimma University specialized hospital (n=365).

| Variables               | Khat use | COR(95% CI) | AOR(95% CI) | P- value |
|-------------------------|----------|-------------|-------------|----------|
| Gender                  |          |             |             |          |
| Male                    | 66(24.7) | 201(75.3)   | 5.73(3.48,9.46) | 5.81(2.96,11.40) | 0.001*   |
| Female                  | 64(65.3) | 34 (34.7)   | Reference   | Reference |
| Ethnicity               |          |             |             |          |
| Oromo                   | 55(25.7) | 159(74.3)   | 4.62(2.45,8.75) | 1.19(0.48,2.97) | 0.705    |
| Amhara                  | 34(50.7) | 33 (49.3)   | Reference   | Reference |
| Gurage                  | 9 (28.1) | 23 (71.9)   | 1.55 (0.74,3.24) | 0.91(0.36,2.28) | 0.838    |
| Others                  | 32 (61.5)| 20 (38.5)   | 4.09 (1.58,10.59) | 1.26(0.38,4.18) | 0.705    |
| Religion                |          |             |             |          |
| Orthodox                | 71(51.8) | 66 (48.2)   | Reference   | Reference |
| Muslim                  | 35(17.9) | 161(82.1)   | 4.95(3.01,18.13) | 4.30(1.54,11.96) | 0.005*   |
| Others                  | 24(75)   | 8(25)       | 0.36(0.15,0.85) | 26.81(8.65,83.10) | 0.001*   |
| Frequency of going to worship places | | | | |
| Never                   | 6(16.2)  | 31(83.8)    | 3.61 (1.39,9.38) | 2.88(0.97,8.57) | 0.057    |
| Sometimes               | 79(35.9)| 141(64.1)   | Reference   | Reference |
| Frequently              | 44(41.1)| 63(58.9)    | 1.25 (0.76,2.00) | 1.07(0.57,2.02) | 0.824    |
| Occupation              |          |             |             |          |
| Unemployed              | 64(31.8)| 137(68.2)   | 1.64(0.98,2.73) | 1.18(0.59,2.37) | 0.646    |
| Gov't Employed         | 27(36.5)| 47(63.5)    | Reference   | Reference |
| Others                  | 39(43.3)| 51(56.7)    | 1.33(0.71,2.50) | 1.31(0.54,3.21) | 0.548    |
| Marital Status          |          |             |             |          |
| Single                  | 53(31.9)| 113(68.1)   | 2.37(0.91,6.17) | 1.80(0.41,6.16) | 0.497    |
| Married                 | 67(37.2)| 113(62.8)   | Reference   | Reference |
| Others                  | 10(52.6)| 9(47.4)     | 1.87 (0.73,4.85) | 1.46(0.39,5.45) | 0.571    |
| Cigarette Smoking       |          |             |             |          |
| No                      | 117(49.3)| 173(50.7)  | Reference   | Reference |
| Yes                     | 13(17.3)| 62(82.7)    | 3.23(1.70,6.13) | 3.04(1.33,6.94) | 0.008*   |
| Major depressive disorder|        |             |             |          |
| No                      | 84(32.2)| 177(67.8)   | Reference   | Reference |
| Yes                     | 46(44.2)| 58(55.8)    | 0.60 (0.38,0.95) | 1.43(0.74,2.77) | 0.291    |
| Schizophrenia           |          |             |             |          |
| No                      | 96(41)  | 138(59)     | Reference   | Reference |
| Yes                     | 34(26)  | 97(74)      | 1.99(1.24,3.17) | 0.87(0.45,1.68) |           |

NB: * Variables that were significant in the multivariate analysis.
with mental illness they may highly use khat to cope up the adverse effects (sedation, hypnotic, fatigue, lethargy and so on) caused by psychotropic medications. However, our study findings were nearly similar with findings from ahoospital based study carried out in Desse, northeast Ethiopia (66.94%) [35]. Khat use was more prevalent among male patients than female patients (75.3% vs. 34.7%), which is in line with the previous Ethiopian studies from Gondar, Jimma, Ataye and Dilla [30,31,36,37].

Muslims had 4.3 times more likely to use khat when compared to Orthodox Christians which is consistent with a facility based study carried out in Jimma, Ethiopia [30]. The odds of using khat in male patients than female patients (75.3% vs. 34.7%), which is in line with the previous Ethiopian studies from Gondar, Jimma, Ataye and Dilla [30,31,36,37].

In this study, schizophrenia (74%) was found to be the most common comorbid disorder with khat use followed by anxiety disorder (73.3%) among primary psychiatric disorders whereas the least comorbid disorder with khat use was major depressive disorder (55.8%). However, in this study the association between khat use and mental disorders was not statistically significant, which is contrary to a review of khat use in different countries [24-27]. Cigarette smokers were 3 times more likely to use khat when compared to nonsmokers which is consistent with studies from Jimma and Gondar, Ethiopia [30,36].

The cross-sectional nature of the study design does not confirm definitive cause-and-effect relationship. Social desirability bias is a potential limitation of this study as persons who use khat and other substances tend to under-report or deny their use when questionnaires are administered by interviewers. Finally, the study was hospital based; therefore precludes generalization to all patients in Ethiopia indicating a need for further study using a more representative sample of patients in the country.

In conclusion, the prevalence of current khat use in this study was high. Current use of khat was significantly and positively associated with male gender and Muslims. Therefore, actions targeting those factors are essential to effectively reduce khat use among psychiatric outpatients.

**Authors’ Contributions**

YZ contributed to the design, conduct and analyses of the research and in the manuscript preparation. GTF and WK contributed to the design, conduct and analyses of the research and in the review of the manuscript. All authors read and approved the manuscript.

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**Abbreviations**

AOR: Adjusted odds ratios; AUDs: Alcohol use disorders; AUDIT: Alcohol Use Disorders Identification Test; COR: Crude odds ratios; JUSH: Jimma University specialized hospital; OPD: Outpatient department; SPSS: Statistical package for social sciences; WHO: World health organization

**Competing Interests**

We declare that we have no competing interests.

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