A cross-sectional study of psychopathy and khat abuse among prisoners in the correctional institution in Jimma, Ethiopia

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Abstract

Background
Khat abuse and psychopathy are both strongly related to criminal activity. Higher rates of substance use in people with psychopathy are hypothesized to be related to psychopathic personality traits, which include high sensation seeking, low conscientiousness and neuroticism, impulsivity, and irresponsibility. Little is known, however, about the association between psychopathy and khat abuse among prisoners in Ethiopia. Therefore, we evaluated the presence of these two factors in prisoners in the correctional institution in Jimma, Southwest Ethiopia.

Materials and methods
We used a cross-sectional study design to collect data from 336 prisoners from June 5 to July 5, 2017. Study participants were selected by a systematic random sampling technique. Khat abuse was assessed with the Drug Abuse Screening Tool and psychopathy with the Psychopathy Checklist: Screening Version. We also assessed nicotine dependence with the Fagerstrom Test for Nicotine Dependence; alcohol use disorder, with the alcohol use disorder identification test; adverse traumatic life events, with the Life Events Checklist; and social support, with the Oslo 3-Item Social Support Scale. Data were entered into EpiData version 3.1 and analyzed in bivariate and multivariable logistic regression models. Variables with a P value < 0.05 in the final fitted model were declared to be significantly associated with the outcome variable.

Results
The overall prevalence of lifetime khat use was 59.9%, and the prevalence of khat abuse in prisoners with psychopathy was 78.0%. Prisoners with psychopathy had a three times higher odds ratio of abusing khat than those without psychopathy (AOR = 3.00 [1.17–7.67]). Among the confounders, a family history of substance use (AOR = 2.50 [1.45–4.31]), poor
support (AOR = 2.28 [1.11–4.67]), alcohol use disorder (AOR = 7.78 [4.16–14.53]), and sui-
cidal ideation and suicide attempts (AOR = 2.26 [1.45–4.31]) were also positively associated
with khat abuse.

Conclusions
The prevalence of khat abuse was higher in prisoners with possible or probable
psychopathy.

Introduction
Khat (Catha edulis) is a plant whose leaves and branches are chewed for their psychomotor
stimulant effects [1]. Khat has numerous names, including kat, qat, qaad, and miraa, and con-
tains different alkaloids, including cathinone, cathine, and norephedrine. Cathinone is the
main active component and causes excitement, loss of appetite, and psychotic symptoms [2].
The prevalence of khat chewing is related to sociocultural habits, the accessibility of khat, and
the enforcement of laws. An estimated 10 million people worldwide chew khat leaves daily [3].
According to the 2016 Ethiopia Demographic and Health Survey, 12% of women and 27% of
men have reported having ever chewed chat [4].

Psychopathy is a personality disorder with interpersonal, emotional, and antisocial features
[5, 6] that is characterized by abnormal affective, interpersonal, and behavioral functioning.
Psychopathic traits include emotional deficits, such as a profound inability to experience
empathy and remorse; additional features include behavioral problems, such as impulsivity,
stimulation seeking, and instrumental aggression [5, 6]. These traits tend to co-occur with a
number of problem behaviors, including substance misuse [7], and some studies show that
they may lead to increased substance use [8, 9]. Research has also indicated that the motivating
factor for substance use is linked to psychopathic personality traits, including high sensation
seeking, low conscientiousness and neuroticism, impulsivity, and irresponsibility [8, 9].

Khat abuse and psychopathy are both strongly related to criminal activity. Individuals with
psychopathy are among the most dangerous and chronic offenders, as evidenced by high re-
offending rates [10, 11]. Psychopathic personality is an important construct that has been
linked to criminal behavior and problematic substance use [12], and substance use greatly
increases the likelihood that psychopathic individuals will engage in serious or violent criminal
activity [12]. Indeed, a large-scale study of aggression and offending found that the best predic-
tor of violence was psychopathic traits in conjunction with substance use [12]. Relative to non-
psychopathic offenders, people with psychopathic traits are more likely to have a diagnosis of
substance abuse or dependence and of poly-substance use [12]. Despite the relevance of psy-
chopathy and khat use for criminal behavior, little is known about their prevalence among
prisoners in Ethiopia.

The data presented in this paper were obtained as part of a study on substance use disorder
and associated factors among prisoners in the correctional institution in Jimma, Southwest
Ethiopia [13]. The findings on an association between psychopathy and substance use disor-
ders in general have been published elsewhere [13]. Here, we present detailed analyses of the
association between psychopathy and khat abuse in this population. In line with the results of
previous studies [14, 15], we hypothesized that psychopathy is significantly associated with
khat abuse.
Materials and methods

Study design and setting

We conducted a cross-sectional study in the correctional institution in Jimma, Southwest Ethiopia, from June 5 to July 5, 2017. The facility serves the Oromia, Southern Nations and Nationalities People’s, and Gambella regions and houses about 1460 prisoners (at the time of the study: 1418 men and 42 women). The prison population includes offenders on remand and people convicted to a limited or lifelong sentence.

Sample size

To calculate the sample size \( n \), we used the single population proportion formula \( n = \left( \frac{Z_{\alpha/2}}{d} \right)^2 \times \frac{P(1-P)}{d^2} \) with a prevalence (\( P \)) of 50%, i.e. 0.5 (because no similar study has been performed in a prison population in Ethiopia), a 95% confidence interval (CI) \( (Z_{\alpha/2} = 1.96) \), and a type I error of 5% (\( D, 0.05 \)). The formula resulted in a sample size of 384. Because the population size was <10,000, we used the finite population correction formula with the calculated sample size of 384 and the total population of 1460 to give \( n_f = 305 \). Thus, assuming a 10% non-response rate the final sample size was 336.

Sampling technique

We selected study participants by a systematic random sampling technique. The total number of prisoners was obtained from the prison administrator and used as the sampling frame. Prisoners who were unable to communicate were excluded from study, so that 1460 prisoners were eligible for the study. The sampling interval was four (1460/336). First, we randomly selected one participant from the first four prisoners listed in the registration book, where prisoners are recorded in the order of their arrival at the prison.

Then, we used the systematic random sampling technique to select one prisoner from every subsequent group of four until the required sample size was reached (\( n = 336 \)).

Data collection procedures

We performed a pre-test on 5% of the prisoners in the Agaro prison, 45 kilometers from Jimma, and subsequently corrected some ambiguous words on the data collection questionnaire on the basis of the responses in the pre-test. In the main study, data were collected by five postgraduate students in mental health. All data collectors were given training on the study objectives, data collection methods, and assessment tools and on maintaining confidentiality, obtaining informed consent and handling ethical issues. The five students were supervised by two Masters of Science in Public Health students and the principal investigator. Questionnaires were checked for completeness, and data were entered into a computer for further processing.

We assessed khat abuse with the Drug Abuse Screening Test (DAST), a 10-item, self-administered questionnaire. The DAST was developed to screen for the use of drugs, including amphetamine, which has a similar chemical structure and similar biochemical effects to khat; a score \( \geq 3 \) on the DAST indicates khat abuse [16]. The reliability of the DAST in this study was 0.88 (Cronbach’s \( \alpha \)). We also assessed lifetime khat use by asking whether respondents had ever used khat.

Psychopathy was measured with the Psychopathy Checklist: Screening Version (PCL: SV). The PCL: SV contains 12 items that assess typical features of a psychopathy life history, i.e. features of criminal, social, occupational, and childhood family environments; items are scored as 0 = not present, 1 = borderline present, and 2 = present. The scores can be interpreted categorically: A score \( \geq 18 \) is taken to indicate probable psychopathy; and a score \( < 18 \) but \( \geq 13 \),
possible psychopathy [17]. The sensitivity of the PCL-SV is 0.94 and the specificity 0.85 [17], and the reliability in this study was Cronbach’s $\alpha = 0.86$.

We assessed the participants’ PCL: SV score by both interview and a file review. The PCL: SV was administered by postgraduate students in mental health, who had been trained by a psychiatrist trained in the use of the instrument.

Data collectors conducted the PCL: SV assessment interviews after performing test assessment interviews in the presence of a trainer to establish norms for scoring individual PCL: SV items. In addition, the trainer also supervised the data collectors during the study.

In addition to examining psychopathy and khat abuse, we assessed the presence of alcohol use disorders (AUDs) with the World Health Organization’s Alcohol Use Disorders Identification Test (AUDIT) [15]. An AUDIT score $\geq 8$ was taken to indicate an AUD. The sensitivity and specificity of AUDIT for AUD are 0.90 and 0.80, respectively [18], and the reliability of AUDIT in this study was 0.87 (Cronbach’s $\alpha$). Also, we assessed adverse traumatic life events with the Life Events Checklist (LEC); a traumatic life experience was defined as experiencing at least one traumatic event. The LEC was developed by the National Center for Posttraumatic Stress Disorder to aid in the detection of posttraumatic stress disorder (PTSD); it has been widely used in cross-cultural settings and is predictive of AUD, anxiety, depression, and PTSD [19]. Nicotine dependence was assessed by the Fagerstrom Test for Nicotine Dependence (FTND; score $\geq 1$ indicates nicotine dependence) [20]. The reliability of the FTND in this study was 0.80 (Cronbach’s $\alpha$). We also assessed social support with the Oslo 3-item Social Support Scale [21]. Finally, we used a questionnaire to assess the following potential explanatory variables for substance use disorder: socioeconomic factors (age, sex, marital status, ethnicity, religion, educational status, occupation, income); environmental factors (family history of substance use, social support, immigration history); behavioral and mental health factors (previous known mental illness, perception that substance use does not impair health, start of substance use at an early age, chronic physical illness, suicidal ideation and attempts); and criminal factors (previous arrests, previous substance-related offences, type of crime, committed a crime under the influence of a substance).

Data analysis

After the tests and questionnaires had been checked for completeness, data were entered into EpiData Version 3.1 and then exported to the Statistical Package for Social Science version 21.0 for further analysis. Descriptive statistics, such as frequencies and medians, were computed, and bivariate and multivariable analyses were used to identify factors associated with the outcome variables.

All variables associated with khat abuse in the bivariate logistic regression with a $P$ value $< 0.25$ were entered together into the multivariable logistic regression by default (enter method) to control for potential confounders. Variables with $P$ value $< 0.05$ were declared to be associated with khat abuse in the final model. An odds ratio with a 95% confidence interval (95% CI) was calculated to assess the level of association and statistical significance.

Ethical considerations

The study protocol was approved by the Research Ethics and Approval Committee of the Jimma University Institute of Health, and the study was performed in accordance with the Declaration of Helsinki. Verbal informed consent was obtained from participants. Prisoners were assured of confidentiality, and they were informed that participation was voluntary and that they could withdraw at any time during the interview without giving a reason for doing so. They were told that their agreement or refusal to participate in the study would not affect
their prison sentence or the possibility of parole. Participants were told that selection for participation in the study was random and that they had the right not to respond to questions that they were not comfortable with and the right to ask questions. The interview was conducted in a private room, and no other individuals were present during the interview. After data entry was complete, the questionnaires were kept securely locked away. Study participants found to have psychopathy and khat abuse were referred to Jimma University Medical Centre.

Results

Socio-demographic characteristics

A total of 329 prisoners participated in the study. The response rate was 97.9%; of the 336 prisoners invited to participate, n = 7 (2.1%) declined because they were unwilling to be interviewed about their khat use histories. The median age of participants was 26 years (inter-quartile range [IQR] 14). Most of the participants had been residing in urban areas before imprisonment and were unmarried. The most common religion was Muslim. Detailed information on socio-demographic characteristics is given in Table 1.

Prevalence of psychopathy and khat abuse

Possible psychopathy was present in 26/329 participants (7.9%; PCL: SV score ≥13 but <18); and probable psychopathy, in 15/329 (4.6%; PCL: SV score ≥18). Psychopathy symptoms are

| Variable                        | Category             | n   | Percentage (%) |
|---------------------------------|----------------------|-----|----------------|
| Sex                             | Male                 | 307 | 93.3           |
|                                 | Female               | 22  | 6.7            |
| Age                             | <30                  | 219 | 66.6           |
|                                 | ≥30                  | 110 | 33.4           |
| Residential setting             | Rural                | 106 | 32.2           |
|                                 | Urban                | 223 | 67.8           |
| Educational status              | No formal education  | 27  | 8.2            |
|                                 | Primary education    | 178 | 54.1           |
|                                 | Secondary education  | 94  | 28.6           |
|                                 | Tertiary education   | 30  | 9.1            |
| Religion                        | Muslim               | 181 | 55.0           |
|                                 | Orthodox             | 97  | 29.5           |
|                                 | Protestant           | 38  | 11.6           |
|                                 | Catholic             | 13  | 4.0            |
| Marital status                  | Married              | 124 | 37.7           |
|                                 | Unmarried            | 205 | 62.3           |
| Occupation                      | Employed             | 134 | 40.7           |
|                                 | Unemployed           | 36  | 10.9           |
|                                 | Farmer               | 99  | 30.1           |
|                                 | Student              | 43  | 13.1           |
|                                 | Other**              | 17  | 5.2            |
| Average monthly income (birr)   | <1200                | 192 | 58.4           |
|                                 | ≥1200                | 137 | 41.6           |

Other

**: retired or homemaker

https://doi.org/10.1371/journal.pone.0227405.t001
shown in Table 2. In the total sample, the prevalence of lifetime khat use was 197/329 (59.9%); and of khat abuse, 138/329 (41.9%). Among the participants with possible or probable psychopathy, 32/41 (78.0%) had a history of khat abuse, and among prisoners with khat abuse, 21/138 (15.2%) had possible psychopathy and 11/138 (8.0%) had probable psychopathy. The most common psychopathic traits were pathological liar (18/138; 13.0%) and a history of juvenile delinquency (14/138; 10.1%).

Types of crimes committed
The most common crimes among prisoners with possible or probable psychopathy were murder 13/41 (31.7%) and assault 13/41 (31.7%) (see Table 3).

| Table 2. Correlations of khat abuse, psychopathic traits among prisoners, Ethiopia, 2017. |
|-------------------------------|--------------------------------------|----------------|
|                               | Psychopathic traits                  | Khat abuse     |
|                               | Pearson Correlation                  | .202**         |
| Glib and superficial charm    | Sig. (2-tailed)                      | .000           |
|                              | N                                    | 329            |
| Grandiose self-worth         | Pearson Correlation                  | .113*          |
|                              | Sig. (2-tailed)                      | .041           |
|                              | N                                    | 329            |
| Pathological lying           | Pearson Correlation                  | .259**         |
|                              | Sig. (2-tailed)                      | .000           |
|                              | N                                    | 329            |
| Lack of remorse or guilt      | Pearson Correlation                  | .208**         |
|                              | Sig. (2-tailed)                      | .000           |
|                              | N                                    | 329            |
| Callousness and lack of empathy | Pearson Correlation                  | .234**         |
|                              | Sig. (2-tailed)                      | .000           |
|                              | N                                    | 329            |
| Early behavior problems      | Pearson Correlation                  | .254**         |
|                              | Sig. (2-tailed)                      | .000           |
|                              | N                                    | 329            |
| lack of realistic long-term goals | Pearson Correlation                  | .264**         |
|                              | Sig. (2-tailed)                      | .000           |
|                              | N                                    | 329            |
| Impulsivity                  | Pearson Correlation                  | .270**         |
|                              | Sig. (2-tailed)                      | .000           |
|                              | N                                    | 329            |
| Irresponsibility             | Pearson Correlation                  | .273**         |
|                              | Sig. (2-tailed)                      | .000           |
|                              | N                                    | 329            |
| Failure to accept responsibility for own actions | Pearson Correlation                  | .273**         |
|                              | Sig. (2-tailed)                      | .000           |
|                              | N                                    | 329            |
| Juvenile delinquency         | Pearson Correlation                  | .216**         |
|                              | Sig. (2-tailed)                      | .000           |
|                              | N                                    | 329            |
| Adult anti-social            | Pearson Correlation                  | .249**         |
|                              | Sig. (2-tailed)                      | .000           |
|                              | N                                    | 329            |
Factors associated with khat abuse

The bivariate analysis found that various socio-demographic, behavioral, mental health, environmental, and criminal factors were associated with khat abuse, as follows: male sex (crude odds ratio [COR]: 2.01; 95% CI: 0.77, 5.128; p = 0.156), living in an urban setting (COR: 1.64; 95% CI: 1.01, 2.65), p = 0.044), psychopathy, multiple traumatic life events, suicidal ideation and suicide attempts, family history of substance use, poor social support, immigration history, and previous history of imprisonment (see Table 4). These variables were included in the multivariable analysis (see Table 5).

The multivariable analysis indicated that the following variables were associated with higher odds of having khat abuse: psychopathy, family history of substance use, poor social support, AUD, and suicidal ideation and suicide attempts (Table 5).

Discussion

In this study, we assessed the co-morbidity of psychopathy and khat abuse among prisoners in the correctional institution in Jimma, Southwest Ethiopia. We found that the prevalence of khat abuse in the 12 months before imprisonment was higher in prisoners with possible or probable psychopathy than in those with no psychopathy.

Psychopathy was one of the factors significantly associated with khat abuse in this study, and participants with possible or probable psychopathy had three times higher odds of khat abuse than those with no psychopathy.

This finding is in line with a study performed in England and Wales, which found that psychopathy is a factor for substance use [22]. The association between psychopathy and substance use is hypothesized to be related to psychopathic personality traits, such as irresponsibility, impulsivity, risk taking, and antisocial behavior [22]. Mental health services in Ethiopia are primarily centralized around Amanuel Mental Specialized Hospital, in the capital city. Psychiatric care in communities is severely affected due to unequal distribution of resources, problems of access to services in remote locations and stigma against people with mental illness. There is a crucial need to improve the delivery of mental health services, particularly those related to the control and prevention of mental illness and substance abuse.

Our findings have implications both for future research on the etiology of offending among people who abuse khat and have AUD and for recognizing ways to prevent offending in this group. The presence from an early age of behavioral problems can escalate into delinquency, criminality, and substance use. We hypothesize that among life-course–persistent offenders, the antecedents of psychopathic traits emerge very early in life. Future research should be
designed to more adequately measure the first signs of psychopathic traits, neurobiological correlates, and the psychosocial factors that act to strengthen and weaken the traits at critical times during development. Furthermore, the roles played by intoxication and substance misuse, abuse, and dependence in offending need to be understood.

The findings of the present study also have implications for intervention. People dually diagnosed with psychopathy and substance abuse present unique challenges. Although they may only represent a small portion of individuals in substance use treatment programs, the presence of substance abuse and personality pathology requires a disproportionate amount of staff attention, time, and money [23]. Furthermore, these people’s motivation for therapeutic change is often weak because people with psychopathy and a substance use disorder rarely present for treatment voluntarily. Prison settings thus represent a golden opportunity to administer clinical interventions in people with psychopathy, khat abuse, and AUD [24].

Once people with psychopathy are in treatment, core psychopathic traits, such as a lack of empathy, an inability to form close personal relationships, and manipulative and callous

Table 4. Bivariate analysis of behavioral, mental health, environmental, and criminal factors among prisoners in the correctional institution in Jimma, Southwest Ethiopia, June-July 2017 (n = 329).

| Variable                      | Khat abuse | COR (95% CI) | P value |
|-------------------------------|------------|--------------|---------|
|                               |            |              |         |
| Sex                           |            |              |         |
| Male                          | 175 (57.0) | 132 (43.0)   | 2.01 (0.77–5.28) | 0.156* |
| Female                        | 16 (72.7)  | 6 (27.3)     | Reference value | |
| Residential setting           |            |              |         |
| Rural                         | 70 (66.0)  | 36 (34.0)    | Reference value | |
| Urban                         | 121 (54.3) | 102 (45.7)   | 1.64 (1.01–2.65) | 0.044* |
| Psychopathy                   |            |              |         |
| No                            | 182 (63.2) | 106 (36.8)   | Reference value | |
| Yes                           | 9 (22.0)   | 32 (78.0)    | 6.11 (2.81–13.28) | 0.001* |
| Adverse traumatic life event  |            |              |         |
| No exposure to traumatic life event | 77 (64.2) | 43 (35.8)   | Reference value | |
| One traumatic life event      | 38 (60.3)  | 25 (39.7)    | 1.18 (0.63–2.21) | 0.609 |
| Multiple traumatic life events | 76 (52.1)  | 70 (47.9)    | 1.65 (1.01–2.71) | 0.047* |
| Mental illness                |            |              |         |
| No                            | 176 (59.1) | 122 (40.9)   | Reference value | |
| Yes                           | 15 (48.4)  | 16 (51.6)    | 1.54 (0.73–3.23) | 0.254 |
| Social support                |            |              |         |
| Poor                          | 88 (47.8)  | 96 (52.2)    | 2.49 (1.38–4.49) | 0.002* |
| Moderate                      | 55 (72.4)  | 21 (27.6)    | 0.87 (0.43–1.79) | 0.710 |
| Strong                        | 48 (69.6)  | 21 (30.4)    | Reference value | |
| Immigration                   |            |              |         |
| No                            | 162 (60.0) | 108 (40.0)   | Reference value | |
| Yes                           | 29 (49.2)  | 30 (50.8)    | 1.55 (0.88–2.73) | 0.128* |
| Previous imprisonment         |            |              |         |
| No                            | 180 (59.8) | 121 (40.2)   | Reference value | |
| Yes                           | 11 (39.3)  | 17 (60.7)    | 2.30 (1.04–5.08) | 0.040* |
| Family history of substance use |        |              |         |
| No                            | 132 (68.4) | 61 (31.6)    | Reference value | |
| Yes                           | 59 (43.4)  | 77 (56.6)    | 2.824 (1.79–4.45) | 0.001* |
| Suicidal ideation and suicide attempts |     |              |         |
| No                            | 152 (62.6) | 91 (37.4)    | Reference value | |
| Yes                           | 39 (45.3)  | 47 (54.7)    | 2.01 (1.22–3.31) | 0.006* |
| Chronic physical illness      |            |              |         |
| No                            | 161 (58.3) | 115 (41.7)   | Reference value | |
| Yes                           | 30 (56.6)  | 23 (43.4)    | 1.07 (0.59–1.94) | 0.815 |
| Perceived that substance use did not affect health | |              |         |
| No                            | 83 (58.5)  | 59 (41.5)    | Reference value | |
| Yes                           | 108 (57.8) | 79 (42.2)    | 1.03 (0.66–1.60) | 0.899 |

Reference value: In the analysis, this variable indicated lower likelihood of alcohol use; coded as zero in SPSS logistic regression

*Identified as factors for multivariable logistic regression analysis (p < 0.25)

COR: Crude odds ratio
95% CI: 95% confidence interval

https://doi.org/10.1371/journal.pone.0227405.t004
behaviors, are barriers to successful therapeutic interventions. Some researchers believe that despite good compliance with therapy and reported therapeutic improvement in correctional settings people with psychopathy simply use what they learn in therapy to supplement their criminal versatility and skill, which explains the well-known negative outcomes of therapy in this population [25].

By treating this population on the basis of their characteristics, we can change both the individuals’ outcomes and the investment that the research community has made in developing new and more effective treatment options for people with psychopathy who misuse substances.

Our study had some limitations. Social desirability bias may have led prisoners to under estimate or underreport khat use. Recall bias may also have been a problem because the data were collected by self-report during an interview and prisoners were reporting on their khat use before being imprisoned, so they may have underestimated khat abuse. The DAST and PCL: SV were not validated in our population, although these instruments have been shown to be useful in screening for amphetamine and psychopathy, respectively, across cultures. We did not check the validity of participants’ responses, for example by performing laboratory tests to detect substances. In addition, we collected data on prisoners only and did not compare the prevalence of khat abuse with a non-prison population. Last, the study used a cross-sectional design and therefore was unable to show a cause and effect relationship between psychopathy and khat abuse.

### Conclusions

Our study found that the prevalence of khat abuse in the Jimma correctional institution was higher in prisoners with possible or probable psychopathy, i.e. prisoners with possible or probable psychopathy had a higher odds ratio for khat abuse than those with no psychopathy. A family history of substance use, poor social support, AUD, and suicidal ideation and suicide attempts were also associated with khat abuse.

The study highlights the need to strengthen addiction health services in the correctional institution in Jimma and to design and implement long-term management plans for recovery.
and rehabilitation from khat abuse. There was a high prevalence of traumatic life event exposure among the prisoners in this study, so we recommend that researchers evaluate prisoners for posttraumatic stress disorder. Further research is needed to determine whether the findings of this study apply to other correctional institutions in Ethiopia and perhaps elsewhere.

Acknowledgments

We would like to thank Jimma University for granting ethical approval. Our deep thanks go to all study participants, who spent their valuable time responding to the questions in this study.

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