



## Correlates of khat use during pregnancy: A cross-sectional study

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### ABSTRACT

**Objectives:** Khat is widely used in East African countries including Ethiopia. A growing body of evidence indicates that long-term khat use is associated with various health consequences. The aim of this study was to examine the magnitude and correlates of khat use in pregnant women.

**Methods:** This study used a cross-sectional, face-to-face interview design that included 642 pregnant women receiving antenatal care services at primary care centers in Ethiopia. A series of chi-square tests and regression models were conducted to examine whether khat use status (i.e., 123 current khat users, 41 former khat users, and 478 non-users) was associated with socio-demographic, mental distress, and substance use measures.

**Results:** As compared with non-users, current and former khat users had higher levels of depressive symptoms and distress. Khat users minimized potential health risks associated with khat use. Social and motivational factors related to khat use were different between current and former khat users.

**Conclusions:** Findings of this study suggest a substantial prevalence of khat use among pregnant women in Ethiopia and highlight the role of socio-demographic and cultural influences on khat use during pregnancy. Health care professionals in the region where khat is available are encouraged to ask their female patients about khat use and encourage them to refrain from use while they are pregnant. The positive link between khat and mental distress warrants further research focusing on biological, psychological, and social mechanisms of this relationship.

### 1. Introduction

Khat (*Catha edulis*) is a natural stimulant widely cultivated and available in East Africa and the Middle East (Belew, Kebede, Kassaye & Enquoselassie, 2000). Chewing fresh leaves of the khat tree is the most common mode of intake (Hoffman & al'Absi, 2010). Acute administration of khat enhances mood and alertness; however, these symptoms are typically followed by discomforts including depression, anxiety, and insomnia (Balint, Falkay, & Balint, 2009; Cox & Rampes, 2003; Nakajima et al., 2014). Cathinone, a chemical structured similar to that of amphetamine, is one of main constituents responsible for the psychopharmacological properties of khat (Kalix, 1990).

In Ethiopia, khat chewing is common. One epidemiological study (Alem, Kebede, & Kullgren, 1999) conducted among 10,468 adults in rural Ethiopia found that 56% of the participants reported khat chewing at some time in their lives. Fifty-percent of them currently chewed khat and 17.4% of them chewed on a daily basis (Alem et al., 1999). Another study (Belew, Kebede, Kassaye, & Enquoselassie, 2000) including 1200

adults found that 32% of the sample were current chewers. The rate of khat chewing in Jimma, where the present study was conducted, was 38.6% (Alemseged et al., 2012).

Despite the broad prevalence, long-term and excessive khat use has been suggested to be associated with major physical (Ali et al., 2011), psychological (Hassan, Gunaid, El-Khally, & Murray-Lyon, 2002), and psychiatric problems (Odenwald et al., 2005). While the underlying mechanism is not well understood (Odenwald et al., 2005), recent studies suggest that psychobiological factors such as stress play an important role in khat-related morbidity (al'Absi et al., 2013). Motivational, social, and cultural norms (Nakajima & al'Absi, 2013) also impact patterns of khat use.

Khat use is widely accepted among pregnant women (Khawaja, Al-Nsour, & Saad, 2008). A link between khat use during pregnancy and delivery complications has been reported (see Mwenda, Arimi, Kyama, & Langat, 2003 for a review). Human studies have found that khat use is associated with low birth weight (Abdul Ghani, Eriksson, Kristiansson, & Qirbi, 1987; Eriksson, Ghani, & Kristiansson, 1991). An-

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other preliminary study found cathine (a constituent of khat) in khat-chewing mother's breast milk and her infant's urine (Kristiansson, Abdul Ghani, Eriksson, Garle, & Qirbi, 1987). Furthermore, daily khat use was associated with an increased risk of anemia among pregnant women (Kedir, Berhane, & Worku, 2013). Despite the fact that these negative pregnancy outcomes pose a significant threat to public health, available data systematically examining khat use in pregnant women are scarce. The purpose of this study was to examine patterns and correlates of khat use during pregnancy in Ethiopia. We report here data regarding socio-demographic information, khat use patterns, motives and attitudes toward khat use, and subjective distress. It was hypothesized that pregnant women who chew khat would report higher levels of subjective distress than those who do not chew khat. It was also anticipated that khat chewers would underestimate harmful effects associated with khat use relative to non-chewers.

## 2. Methods

### 2.1. Participants

This study was conducted in Jimma zone in southwest of Ethiopia. An estimated 2.7 million people live in Jimma zone area which covers 15,569 km<sup>2</sup> of the region (Central Statistical Authority, 2006). Three hospitals and 84 primary health centers exist in the zone where antenatal care services are available. Twelve public health facilities are also affiliated with Jimma University. Based on the number of pregnant women who attend antenatal care each year in Jimma zone (Jimma Zone Health Report 2012/13, unpublished data), a reasonable sample size of 660 was calculated using single population formula and probability proportional to size sampling techniques. Participant recruitment was completed in 11 primary care centers and one hospital in Jimma, Ethiopia between June and August of 2013. All pregnant women visiting the designated health care centers for antenatal care were approached and 642 completed this project. The study received approval from the ethical review board of Jimma University and the Institutional Review Board of the University of Minnesota.

### 2.2. Measures and procedure

Questionnaires regarding demographic information (e.g., age, education) and substance use (e.g., khat, tobacco, alcohol) were adapted from those used in previous studies (Nakajima et al., 2013) or developed by WHO (WHO, 1994). They were translated into local languages (Afan Oromo and Amharic) using the back-translation method. Several questionnaires were also collected to examine the relationships between psychosocial and behavioral variables and khat use. The Ethiopian version of the Edinburgh Postnatal Depression Scale (EPDS) was used to assess depressive symptoms in pregnant women (Hanlon et al., 2008). The Ethiopian version of the Self-Report Questionnaire (SRQ-20; Hanlon et al., 2008) was also used to assess psychological distress. The Ethiopian translated version of the Kessler Psychological Distress Scale (K10) has been shown to have acceptable psychometric properties among postnatal women in Ethiopia (Tesfaye, Hanlon, Wondimagegn, & Alem, 2010). In addition, the Ethiopian versions of the Patient Health Questionnaire-9 (PHQ-9; Gelaye et al., 2013) and the Household Food Insecurity Access Scale (HFIAS; Jebena et al., 2015) were administered.

This study used a face-to-face interview method. Participants were reached after their antenatal care. A team of qualified investigators asked pregnant women if they are interested in participating in the study. After obtaining consent, a trained interviewer asked questions regarding socio-demographic information, khat and other substance use patterns, depressive symptoms, psychological distress, and food insecurity. Each interview took approximately an hour to complete.

### 2.3. Data analysis

Analyses using two questions, “Have you ever chewed khat? (yes/no)” and if yes, “Do you currently chew khat? (yes/no)”, found that 25% (n = 164) of pregnant women had chewed khat at least once in their life. Of those, 123 identified themselves as current khat chewers and 41 reported themselves as former khat chewers. The rest (n = 478) reported that they had not used khat before (i.e., non-chewers). A series of chi-square tests and one-way analysis of variance (ANOVA) were conducted to examine whether socio-demographic information, substance use pattern, and perception toward substance use were associated with khat use status (current chewers, former chewers, non-chewers). Variables that were statistically significant in these models were included in a multiple logistic regression model to test associations with khat use status after controlling for influences of other independent variables. The same approach was taken to examine which khat use pattern measures were related to khat use status (current and former chewers). For subjective distress and negative affect, one-way ANOVAs were conducted to test khat use group differences. Tukey's pairwise comparison tests were conducted as a follow-up of significant main effect of khat use groups. A multiple logistic regression model including significant socio-demographic correlates and all distress measures was conducted to test which distress measure(s) was predictive of khat use status after controlling for confounders. p-Values < 0.05 were considered statistically significant. SPSS version 20 (IBM Corp., Armonk, NY) was used for data analysis.

## 3. Results

### 3.1. Participant characteristics

The mean age of this sample was 25.8 (SEM: 0.3) and 91% of them reported being married (see Table 1). These variables did not differ across groups. Current khat use was associated with living in a rural area, being farmers, being Muslim, having a lower education level relative to former and non-chewers, having an older partner, and more children relative to non-chewers (see Table 1). Former chewers were more likely to report having family members or relatives with mental health problems.

### 3.2. Drug use, social settings, attitude toward khat use

Self-reported tobacco, alcohol, and other substance use was low in this sample (ever smoked < 1%; ever drank 6%; ever used other drugs 3%; see Table 1). Current khat chewers were more likely to use other illicit drugs than other two groups. Current chewers were more likely to have partners that chewed khat and have khat producers or sellers in their home. Perceived risk due to khat use showed a dose-dependent relationship (see Table 1). That is, current chewers tended to minimize potential harm associated with khat chewing, such as financial, social, physical, psychological, and reproductive problems more than former chewers who, in turn, tended to underestimate the harm relative to non-chewers.

A multiple logistic regression including significant socio-demographic, social setting, and attitude variables as predictors (see Table 1) revealed that these variables significantly predicted khat use status (overall model:  $\chi^2 = 370$ ,  $p < 0.001$ ). In this model, religion, education, having family members or relatives with mental health problems, number of children, have partners who chewed khat, financial issues, physical health and reproductive problems predicted khat use ( $p < 0.05$ ). A final model including these significant predictors (overall model:  $\chi^2 = 452$ ,  $p < 0.001$ ) indicated that, in general, the prediction of current khat use relative to nonusers resulted in larger calculated odds than the prediction of former use (see Table 2). The demographic variables predicted 4 to nearly 25 times an increase in current khat use relative to nonusers while the same range was just over

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