THE FIRST EUROPEAN
Khat Research Program
Conference

26 – 28 SEPTEMBER, 2013
FRANKFURT AM MAIN, GERMANY

Conference Booklet
Conference Committee

Stephan Bongard (Chair)
Goethe-University Frankfurt, Germany

Mustafa al’Absi (Co-chair)
University of Minnesota, USA

Peer Gatter
German International Cooperation (GIZ), Germany

Rick Hoffman
University of Minnesota, USA

Saba Kassim
Queen Mary University of London, UK

Abdul Mohammed
Linnaeus University, Sweden

Michael Odenwald
University of Konstanz, Germany

Stefan W. Toennes
Goethe-University Frankfurt, Germany

Sabine Windmann
Goethe-University Frankfurt, Germany

We would like to express our appreciation to the following for their support in preparing and conducting this conference:

Katharina Kupper
Bingshuo Li
Benjamin Pieck
Sandro Wiesmann
Conference Locations

The [conference](#) will take place at the [Hörsaalzentrum](#), Lecture Hall 11, at the Goethe University Frankfurt, Campus Westend (see [location 4](#) on the map on the right).

The 'get-together/reception' on September 26th will take place at the Department of Psychology in the [PEG-Building](#), 5th floor, room 202 (see [location 9](#) on the map on the right).

The [registration station](#) will be located at entrance hall of the [PEG-Building on Thursday](#), Sept. 26 and it will be located at the entrance hall of the [Hörsaalzentrum on Friday](#), Sept. 27.

[Lunches](#) can be obtained at the [Mensa Casino](#) (location 2a on the map) on Friday and the Cafeteria 'Explizit' in the Law and Business Building (location 5 on the map) on Saturday.

An interreligious [prayer room](#) is located in the "House of Silence" (location 7 on the map).

A [conference dinner](#) will take place at the Turkish hallal-restaurant [Kekik](#), Zuckschwerdt Strasse 16. From Frankfurt Central Train station take [tram line 11](#) to its final destination 'Zuckschwerdt Strasse'. Than you'll find the restaurant directly at the tram station on your left hand side.

For [public transportation](#):
U-Bahn (subway) Line 1, 2, 3 and 8: Station Holzhausenstraße
Bus 32: Miquelallee/Hansaallee
Bus 36: Uni-Campus Westend
Bus 64: Bremer Straße
(all the relevant bus and U-Bahn stations are marked as H or U on the map on the right)

For [taxi or driving](#), please use the address “Grünburgplatz 1, Frankfurt am Main”.
Conference Schedule

Thursday, Sept 26

17:00 – 20:00  Registration at the entrance hall PEG-Building (No. 9 on map)
19:30 – 21:00  Get-together/reception at the Department of Psychology, PEG-Building, 5th floor, room 202 (No. 9 on map)

Friday, Sept 27

08:00 – 09:30  Registration at the entrance hall of the Hörsaalzentrum (No. 4)
09:00 – 09:30  Opening Remarks by Mustafa al'Absi & Stephan Bongard

Symposium 1: Khat Research in Europe: Patterns and Trends (Chair: Saba Kassim)
09:30 – 09:55  Bongard & Pieck: Khat Use in migrants from East-Africa living in Frankfurt am Main/Germany
10:20 – 10:45  Werse & Morgenstern: Why cathinone derivatives (might) belong to the most popular new psychoactive substances (NPS)
10:45 – 11:10  Abdi & Adnell: Swedish strategies and policies on the prevention of khat abuse

11:10 – 11:30  Coffee break
11:30 – 12:15  Lecture by Stefan W. Toennes: Khat – Analysis of biofluids and pharmacokinetics
12:15 – 13:30  Lunch break & networking
**Symposium 2: General & Clinical Neuroscience of Khat** (Chair: Sabine Windmann)

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<th>Time</th>
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<tr>
<td>13:30 – 13:55</td>
<td><strong>Mikulica &amp; Odenwald:</strong> Executive functions among active khat users in Nairobi</td>
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<tr>
<td>13:55 – 14:20</td>
<td><strong>Hoffman &amp; al’Absi:</strong> Concurrent use of khat and tobacco is associated with verbal learning and delayed recall deficits</td>
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<td>14:20 – 14:45</td>
<td><strong>Muche et al:</strong> Effect of ethanol and khat (catha edulis forsk) on the total number of purkinje neurons in early postnatal rats</td>
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<td>14:45 – 15:10</td>
<td><strong>Widmann et al:</strong> Changes in cortisol levels in khat-dependent Somali refugees in correlation with traumatic stress</td>
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<td>15:10 – 15:40</td>
<td>Coffee break &amp; networking</td>
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**Symposium 3: Intervention** (Chair: Mustafa al’Absi)

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<tr>
<td>15:40 – 16:05</td>
<td><strong>Nordgren:</strong> Targeting khat use - a critical discourse analysis of intervention evaluation reports concerning khat use in the Scandinavian countries</td>
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<td>16:05 – 16:30</td>
<td><strong>Elkashef et al:</strong> Pharmacological treatment of khat and other stimulants use disorders</td>
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<td>16:30 – 16:55</td>
<td><strong>Hoffman:</strong> Treatment of combined khat and tobacco dependence</td>
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<td>16:55 – 17:20</td>
<td><strong>Odenwald &amp; Widmann:</strong> Psychotherapeutic interventions to reduce khat consumption: What we know, what we don’t know and what the challenges are</td>
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<th>Time</th>
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<tr>
<td>19:30 – 21:30</td>
<td><strong>Conference Dinner at restaurant Kekik, Zuckschwerdt Strasse 16, final destination of tram line 11</strong></td>
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**Saturday, Sept 28**

**Symposium 4: Comorbidity: Health and Substance Abuse** (Chair: Rick Hoffman)

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<tr>
<td>9:00 – 9:25</td>
<td><strong>Kassim &amp; al’Absi:</strong> A hidden daily tobacco smoking within khat chewing among UK-resident khat chewers</td>
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<td>9:25 – 9:50</td>
<td><strong>Nakajima &amp; al’Absi:</strong> Correlates of concurrent use of khat and tobacco</td>
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<td>9:50 – 10:15</td>
<td><strong>Leach &amp; Rogers:</strong> Mapping the effects of khat (catha edulis) and tobacco on the human brain: A biological illustration supporting the common pattern of dual substance use among khat chewers</td>
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<td>10:15 – 10:40</td>
<td><strong>Yitna et al:</strong> Effect of khat (catha edulis) on bronchial asthma in Jimma University specialized hospital, adult chest clinic, Jimma Ethiopia</td>
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<td>10:40 – 11:05</td>
<td><strong>Sewiye:</strong> Effects of Qat on Lung Volumes &amp; Ventillatory Capacity</td>
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11:05 – 11:30 Coffee break & networking
11:30 – 12:15 Lecture by Peer Gatter: Politics of Qat in Yemen
12:15 – 13:15 Lunch break & networking

**Symposium 5: Social and Political Issue Related to Khat** (Chair: Michael Odenwald)

13:15 – 13:40 Alsharqi: Controversy about khat issues
13:40 – 14:05 Astatkie & Berhane: The social effects of khat
14:05 – 14:30 Abubakar & Baguma: The social dynamics of consumption of khat (mairungi) in Butambala, Mpigi district, Uganda
14:30 – 14:55 Alsanosy: Building capacity in khat research: Substance Abuse Research enter (SARC) experience
15:20 – 15:20 Brief break
15:20 – 15:30 Al-asbahi: Recent actions to uproot qat in Yemen and need for policy action
15:30 – 16:30 Discussion on future initiatives of the KRP and closing of the conference

**Options for evening/night activities:**

1. Taking a sightseeing-ride on Frankfurt’s Ebbelwei Express (Apple Wine Express), a historic tram that passes by many of Frankfurt’s sightseeing attractions. While on board, you can enjoy a glass of Frankfurt’s traditional apple wine (or apple juice):

2. Boat tour on the Main river. Last tour starts 5 pm (50 minute ride, EUR 8.40 per adult)

3. Spooky tour through Frankfurt (starting at 10 pm):

**Music clubs in downtown Frankfurt:**

Gibson  [http://www.gibson-club.de/](http://www.gibson-club.de/)
Music: House
Dress code: Casual is ok; Price: 12 EUR
Address: Zeil 85-93, 60313 Frankfurt

Party for people over 30 (Ü30 Party)
Location: Südbahnhof (train station in the south of Frankfurt)
Music: "Dance classics"; Price: 7 EUR
Abstracts

1st European Khat Research Program Conference

26 – 28 SEPTEMBER, 2013

Goethe-University Frankfurt
Swedish Strategies and Policies on the Prevention of Khat Abuse

Yakoub Aden Abdi¹,² and Gun Adnell¹

¹) Centre for Substance Abuse and Dept. of Clinical Neuroscience, Stockholm, Sweden
²) Karolinska Institutet, Stockholm, Sweden

**Background:** Khat (*Catha Edulis*) is a plant which contains amphetamine like alkaloids and chewed by millions of people in the Horn of Africa and parts of the Arabian Peninsula for its stimulant effects. In Europe, the use of khat has been a controversial issue.

**Objectives:** The purpose of this work is to examine the Swedish strategies and policies enacted to curb the abuse of khat.

**Methods:** Our presentation is based on information and data collected through PubMed, Swedish government institution’s websites (*Riksdagen.se, Tullverket.se, brå.se and Beroendecentrumstockholm.se*) and Google.

**Results:** During the past twenty years, the khat issue has been hotly debated in the Swedish media, in the political circles and among the public, often encouraging the government to take stricter measures to tackle the abuse of khat in the country. Sweden was one of the first countries in Europe to classify khat as a narcotic in 1998 and the Swedish politicians have been active at the European Union (EU) level for khat to be prohibited throughout the EU. Sweden sponsored also an international conference on khat in Stockholm in 2007 where the World Health Organization was invited. Between 2000 and 2012, the Swedish police and customs seized 2 to 18 tons of khat each year, while 1477 individuals were sentenced by court due to khat related offences during the period from 2000 to 2009. Recently, Sweden launched the first khat clinic in support of khat addiction management and initiate research on this substance abuse.

**Conclusion:** The presenter will discuss Sweden’s role in curbing khat abuse in the country and will shed light into future endeavors.

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The Social Dynamics of Consumption of Khat (Mairungi) in Butambala, Mpigi District, Uganda

Ssentongo Abubakar¹ & Peter K. Baguma²

1) Makerere University, PO Box 7062 Kampala Uganda
2) School of Psychology, makerere University, Uganda

Objective: The study on the Social Dynamics of Consumption of khat (Mairungi) in Butambala County, Mpigi district was carried to identify the type of people who consume Mairungi, establish reasons why Mairungi is consumed and to explore social, health and economic effects of Mairungi consumption on the study population.

Method: The researchers employed a cross sectional survey design that generated both quantitative and qualitative data. A sample size of 65 respondents was selected from among the consumers, farmers, middlemen, relatives and civic leaders. They were purposively selected from the prominent producing and consuming centres of Kalamba and Kibibi sub counties. Two instruments were employed, a semi-structured interview schedule for the fifty consumers who were the principal respondents and an interview guide for fifteen key informants. Data was analyzed using quantitative and qualitative techniques.

Results: This research found out that Mairungi is chewed for various reasons; 50% of the respondents chew in order to identify with others as a result of peer pressure, because of the euphoria it creates, enhances libido yet ironically some used it to avoid casual sex. It is used to cure various diseases like jaundice and ulcers, to stay awake and for enhanced body strength. An elder believes that the Khat herb is useful to mankind if it is used appropriately in right doses and for rightful purposes.

Conclusions: Despite the above, consumption leads to many negative effects; stigma where consumers are regarded as social misfits, addiction, impotence, failure to sleep, mental disorders and loss of man hours because most time is spent while chewing. The harmful effects of Mairungi outweigh the benefits and after all there are better medicines available to cure the diseases that it is believed to cure. For the growers in Butambala, it is a source of income, but it is grown at the expense of food production thus affecting food security in the area. Mairungi consumption especially in its raw form should be restricted and the youth given alternative livelihoods.

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Recent Actions to Uproot Qat in Yemen & Need for Policy Action

Qahtan Al-asbahi

Background: Yemen has around 167,000 hectares of qat field grown in several highland governorates. In some of these governorates local communities have started to uproot qat and are replacing it with substitute crops in order to reduce the qat areas. The aim is to have less qat supply in the markets and to achieve overtime a reduction of qat chewing in the country.

Objective: define clear policy actions to support existing actions to uproot qat.

Method:

1- Literature review, interviews with some farmers, technical engineer, agronomists, agricultural & rural development planners, and decision makers.
2- Analyze the actions to uproot qat in Yemen and evaluate how those actions were decided upon and how these could be strengthened and extended to wider areas.

Results: It is found that efforts to uproot qat are still limited compared to the regular qat expansions & growth in new areas. The analysis shows that efforts are also scattered, not organized, and not planned in most cases of uprooting. It is also based on personal efforts by the governors e.g. the governor of Dhamar.

Conclusions: The uprooting efforts do not have a specific agenda or policy and have no monitoring and evaluation guidelines to document the uprooting events and gather statistics. In order to activate the uprooting in a systematic way certain programs should be implemented and enhanced with policy agenda of actions through cross cuttings sectors and subsectors such as creating an uprooting system, creating Farming advisory Service (FAS), create a concept of the best village without Qat, and establish a network of volunteers groups to support achieving the policy targets towards better results for Yemen’s qat uprooting agenda.

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Building Capacity in Khat Research: Substance Abuse Research Center (SARC) experience

Rashad Alsanosy, MD
Substance Abuse Research Center (SARC), Jazan University
Jazan, Kingdom of Saudi Arabia

Khat is widely consumed among the population in Jazan region which is located at the southern border of Saudi Arabia next to Yemen. It is considered as a major national and regional problem. Recently (2011) Jazan University decided to face this challenge by establishing the Substance Abuse Research Center (SARC) as a part of a huge project for developing centers of excellence funded by the Saudi Ministry of Higher Education. Centers of excellence are developed to focus on different major research topic. The focus of SARC is to work on substance abuse research.

SARC started on the local level establishing a steering committee and a strategic plan. A multi-disciplinary Scientific Committee with national and international experts was then established to develop research priorities. The third stage was the call for proposals to be funded by SARC. In parallel, SARC started anti khat campaigns to collect data for research and to develop successful interventions. SARC evaluation process started with the establishment of the strategic goals and the evaluation outcome is continuously used to redirect the SARC activities.

Twelve major research projects were funded by SARC so far. SARC researchers were able to get extra funds from the King Abdul Aziz City for Science and Technology. Ten Scientific papers were published in international journals. Many training courses were held to develop new researchers. The biggest anti Khat campaigns (Stamp of Change) was held for 9 months. SARC developed handbook for peer training against drug use. In march 2013 SARC hold an international khat addiction conference for the first time in Jazan.

The aim of this oral presentation is to share with the audience the SARC experience in building capacity for substance abuse research on regional, national and international levels.

Rashad Alsanosy, MD
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Controversy About Khat Issues

Abdullah Alsharqi, MD
Consultant of Psychiatry and Addiction Medicine Specialized Psychiatry Clinics
Head SARC scientific committee, Jizzan, Saudi Arabia

Khat use habit is spread in Africa and southern Arabian Peninsula, it is also prevalent to a lesser extent in some western societies especially among immigrants coming from countries where khat use is widely spread. The khat is used because of its stimulating effect on the brain and body that result from the psychoactive substance in the khat leaves called cathinone and cathine.

The khat chewing is considered as an ingrained habit in some of the communities and there is disagreement among members of these communities even among educated people and scientist about the negative effects of khat on the individual and society and also there is a rejecting attitude against considering khat as a substance of abuse.

The dispute in some of the Islamic communities goes beyond scientist to the Islamic religious scholars where some of them believe that khat use is prohibited by Islam while some of them argue against the prohibition which could be one of the causes of khat use.

Although there are many recent studies on the Khat use and its impacts, there are many issues that have not been resolved and many questions that have no definite answers, the Unresolved issues include for example the effect of khat on mental health, physical health, pregnancy, lactation, economy, environment, productivity, violence, crime etc. In addition to other issues related to its addictive nature, availability of effective prevention and treatment intervention as well as legalization and religious opinion about the prohibition of its use.

In this paper we will discuss some of the controversy and unresolved issues related to khat use and will come up with some recommendation about the future direction of research in this area.

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The Social Effects of Khat

Ayalew Astatkie¹ and Yemane Berhanë²

1) School of Public and Environmental Health, College of Medicine and Health Sciences, Hawassa University, Hawassa,
2) Addis Continental Institute of Public Health, Addis Ababa, Ethiopia;

Background: Chewing khat (Catha edulis Forsk.) has been shown to have varying social effects in different contexts. However these effects published independently have not been synthesized together to assist easy access of the evidences to relevant stakeholders.

Objectives: This work is aimed at reviewing and synthesizing social effects of khat and identifying gaps for future research endeavors.

Methods: Search of the available literature was carried out using common search engines such as Google, Google Scholar, Microsoft Academic Search, PubMed and Web of Science.

Results: The evidence shows that the use of khat is associated with several social effects—both positive and negative. On the positive side, it serves as an employment opportunity and source of income for those involved in the cultivation and in the chain of the marketing process. It also serves as an export commodity for countries in which it is cultivated. On the other hand, it has been shown to be deleterious in terms of being a factor in family disharmony and breakdown, diverting household and individual income, resulting in delay and absenteeism from work and threatening food security. However, in most of the circumstances, a clear cause-and-effect relationship (or at least a temporal relationship) cannot be established.

Conclusion: Further researches are clearly required to gather more evidence on social effects of khat from diverse socio-cultural settings.

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Khat Use in Migrants from East-Afrika Living in Frankfurt am Main/Germany

Stephan Bongard & Benjamin Pieck
Department of Psychology, Goethe-University Frankfurt, Germany

**Background:** Frankfurt am Main is one of the biggest cities in Germany with about 50% of its residents being sojourners, migrants or children of migrants. These people bring their traditions to Frankfurt which sometimes might be in conflict with German laws, like the tradition of khat chewing.

**Objectives:** We intended to describe khat chewing habits within the population of migrants from East-Africa countries and to relate this behavior to migrants' strategy of acculturation.

**Methods:** Ninety participants from countries with a khat chewing tradition participated in standardized face to face interviews addressing their consume behavior and acculturation strategy.

**Results:** In general, the khat chewing behavior pattern was similar to what is reported from countries with a tradition in khat chewing. Migrants who reported an acculturation strategy of 'integration' also reported to chew less khat than their 'separated', 'assimilated' or 'marginalized' peers. Contrary to our expectations however a stronger orientation toward the culture of origin correlated with less khat consumption. No differences in khat consume were found between the several East-African ethnic groups and between men and women. The most often reported reason for chewing khat was that it helps to cope with bad memories.

**Conclusion:** Khat consume within the population of migrants in Frankfurt am Main is inversely related to migrants' boundaries to their country of heritage and mainly serves as stress coping tool. Helping these migrants to better cope with stress might help to reduce their khat consumption.

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An exploratory Cross-Sectional Study of the Khat Market in East London: Unwrapping Khat Bundles

Asha Dalsania, Ray Croucher & Saba Kassim

Queen Mary University of London, Barts and The London School of Medicine and Dentistry

Background: The chewing of the khat leaf amongst diaspora communities originating from East Africa and the Arabian Peninsula has become a public health concern. The recent UK policy is more likely to ban khat. Establishing the market for khat in the UK is important as robust policies concerning regulation cannot be made on little supportive evidence.

Objectives: To establish the market for khat specifically its accessibility, affordability and availability.

Methods: A cross-sectional study used snowball sampling to recruit khat vendors. Data was collected via face-to-face interviews. Descriptive and correlative data analysis was employed.

Results: Five out of seven outlets approached agreed to participate in the study. The number of years of khat sale ranged between 1 to 15 years and trade often occurred between 2pm-10pm. The khat sale outlets were in close proximity to each other. Customers were often male adults of Somali origin. Payment was usually by cash with vendors offering a ‘pay later’ service. Khat outlets were self-declared community centres that facilitated social interaction. Lara type of Mirra khat, chewed by Somalis, was the most popularly chewed khat. Mirra was sold in pre-wrapped bundles of approximately 250g bundle at £3 and delivered to the shop four days a week. Owdi was the most popular type of Herari khat, chewed mainly by Yemenis, and was sold in 200g, 400g and 1kg. It was priced between £5 and £20 and was delivered two days a week. Supply and demand were found to be positively correlated (p=0.01).

Conclusions: This study established the khat market in East London. Khat outlets whilst primarily were businesses due to sale prices and the set of delivery days also provided a community service (place for social interaction) to their predominately Somali customers. Future research should track changes in the retail khat market that follow the recent changes to the current UK regulatory environment for khat.

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Pharmacological Treatment of Khat and Other Stimulants Use Disorders

Ahmed Elkashef, M.D., Dr. Abdullah Al-Sharqi, and Dr. Rashad Al-Sanousy

Head, Research and Clinical Studies Section, NRC, Abu Dhabi
Member, SARC scientific committee, Jizzan, Saudi Arabia
Associate professor of Psychiatry, George Washington School of Medicine

Khat use pose a public health dilemma to countries in the horn of Africa and the Arabian Peninsula. Albeit culturally acceptable Khat use is associated with many health and psychiatric complications that warrant research in its prevention and treatment.

The recently established Substance Abuse Research Center (SARC) located at Jizzan University is leading the efforts in the kingdom of Saudi Arabia in providing evidence based clinical interventions to treat khat addiction.

A recently conducted literature search showed very little published information on medications that have been tried to treat Khat addiction. Two case reports, one using the antidepressant Bupropion in a co-morbidly depressed khat user, and the other using the dopamine agonist bromocriptine in two cases are the only publications found on PubMed.

The similarities of the pharmacodynamic effects of khat to other amphetamine type stimulants and cocaine may justify using medications that have shown efficacy in the treatment of other stimulants use disorders, to treat khat use disorders.

Few medications have shown positive signals for cocaine and methamphetamine addiction. Modafinil (provigil), topiramate (topamax), disulfiram (antabuse), bupropion (Zyban/wellbutrin) and naltrexone are examples such promising medications for stimulants dependence. Clinical trials using these medications to test their efficacy in treating khat addiction are warranted.

Recently advances in immunotherapy lead to the development of vaccines and monoclonal antibodies to treat and possibly prevent relapse to stimulants addiction. Similar approaches could be studied for the treatment of khat addiction as well.

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Politics of Qat in Yemen

Dr Peer Gatter
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For Imam Yahya, one of Yemen’s last kings, qat was a delight that he praised in poems. For his adversary, the revolutionary al-Zubayri, the plant was the ‘devil in the shape of a tree’. Even today views on qat diverge greatly. For some, qat farming is the perpetuum mobile of Yemen’s rural economy, for others the drug is to blame for poverty, corruption and the depletion of water resources. With Yemen’s 2011 revolution a decade of half-hearted qat policies and missed opportunities has come to an end – a decade, however, that has succeeded in lifting the veil of silence that was cast over qat in media and politics after President Salih came to power in 1978. With the forecast depletion of Yemen’s oil and gas reserves within the next decade, the economic importance of qat will increase further and will bring about an important shift in the balance of power from the central government towards the qat producing highland tribes. The challenge of addressing the qat problem is thus tremendous for Yemen’s policy makers.

Unrestrained qat farming was for long part of a ruling bargain between Salih and the tribes that has profited both sides and imparted highland Yemen several decades of relative stability and President Salih a 33-year rule. This ruling bargain included qat tax exemptions for certain tribal areas and for Salih’s native Sanhan district, a lowering of the qat tax from 30 to 10 % just months after Salih came to power, import restrictions for qat, an elimination of qat from national statistics, and subsidies on irrigation equipment and on diesel, the latter being crucial for powering pumps for qat irrigation. Tribal qat incomes however undermine central government authority. Tribes that realize substantial profits from the qat trade are less dependent on the patronage of the regime and more independent in their actions. The government has little leverage in these tribal highland areas and government control is at best nominal there. A substantial share of qat proceeds flows into purchasing arms, land and into drilling wells. Armed conflicts over land and water are thus on rise.

Qat smuggling also finances the Sada insurgency. If indeed Iran financially supports the Zaydi rebels, this support is likely to be little compared to the gains the insurgents realize with qat smuggling to Saudi Arabia. This qat smuggling trade is believed to amount to around US-Dollar 1 billion annually. In the post-oil era and with the erosion of its ability of patronage the regime must have a vested interest to better control and tap the financial flows of the qat trade. An improved system of taxation or even a government export monopoly to the non-qat growing lowlands (as it is enforced in Ethiopia) should be in the regimes interest.

But fighting qat is difficult. Qat chewing is one of the few things that Shafii merchants of Yemen’s southern littoral and Zaydi tribesmen of the northern highlands share. Qat has defined Yemeni identity over the past decades. For many chewers “qat” and “Yemen” have become one. Being anti-qat is thus often perceived as being anti-social and non-Yemeni. But the anti-qat movement has gained again momentum in Yemen’s revolution via facebook and twitter campaigns as well as in the protest camps of Sana’a streets. Fighting qat became part of fighting Yemen’s dictatorship and qat was suddenly perceived as being part of a corrupt regime. By fighting qat the activists declared a “revolution against one’s self”. Is this the beginning of a new era in Yemen also in terms of qat?

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Treatment of Combined Khat and Tobacco Dependence

Richard G. Hoffman, Ph.D.

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**Background:** A substantial number of khat users also concurrently use tobacco and some negative neurobehavioral effects are seen only in khat users who also use tobacco, but not in individuals who only use khat. There are also more serious physical health effects for khat users who also use tobacco compared to those who only use khat. There are currently no established treatment protocols for khat dependence or for the treatment of the combined use of khat and tobacco.

**Objectives:** To provide an overview of the extent of combined khat and tobacco use, provide a brief review of the negative health consequences of using tobacco and using khat, review the pharmacological and non-pharmacological interventions that have historically demonstrated efficacy in the treatment of tobacco dependence and amphetamine dependence, and suggest possible treatment models for combined khat and tobacco dependence.

**Methods:** A literature review was completed of the known deleterious health effects of khat consumption and tobacco use. The available scientific literature related to successful pharmacological and behavioral treatment of amphetamine abuse and dependence was also reviewed, as was that same literature related to the treatment of tobacco dependence, in both cases emphasizing treatments that demonstrated efficacy in randomized controlled trials.

**Results:** Cognitive behavioral therapy, motivational interviewing, and contingency management have demonstrated efficacy in both tobacco smoking cessation and in the treatment of amphetamine dependence. Although there are no “gold standard” treatments that have emerged for pharmacotherapy treatment of amphetamine dependence or for smoking cessation, there are several promising candidates.

**Conclusions:** There may be useful public health models that can be used to discourage the combined use of khat and tobacco that have been effective in smoking cessation and primary prevention of tobacco use. It may also be possible to effectively combine existing treatment models that have been used for smoking cessation and for the treatment of amphetamine use disorders, primarily multicomponent interventions involving cognitive behavioral therapy, motivational interviewing, contingency management, and concurrent pharmacological therapy.
Concurrent Use of Khat and Tobacco is Associated with Verbal Learning and Delayed Recall Deficits

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Background: The present study assessed whether cigarette smokers who are also regular khat users would demonstrate greater impairments in verbal learning and recall compared to both non-smokers who are khat users and control subjects.

Methods: Subjects were 175 Yemeni college students (90 men, 85 women) ranging in age from 18 to 38 years. Seventy-five subjects were self-reported chronic cigarette smokers and khat users, 48 non-smoking subjects were self-reported to be chronic khat users and 52 non-smoking subjects reported no current use or history of khat use. Verbal learning and verbal memory recall was assessed by subject performance on the Arabic version of the Rey Auditory Verbal Learning Test (RAVLT).

Results: Statistically significant differences (P < 0.05) were observed in RAVLT acquisition learning trials 2-5 and on delayed recall measures between concurrent khat and cigarette users compared to both the khat-only group and the control group of non-users of khat and cigarettes. On each of these trials, concurrent users recalled fewer words, demonstrating a slowed rate of verbal learning. This same pattern of performance was also seen on delayed recall measures. Khat use alone did not affect immediate or delayed recall of previously learned words.

Conclusions: Khat users who smoke cigarettes have a lower rate of verbal learning and delayed recall of previously learned verbal material than khat users who do not smoke cigarettes. This may be due to pre-existing differences between these groups of subjects.

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A Hidden Daily Tobacco Smoking Within Khat Chewing Among UK-residents Khat Chewers

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Background: The chewing of khat leaf is often associated with tobacco use and often shapes the pattern and methods of tobacco smoking.

Objective: To assess aspects of tobacco smoking amongst khat chewers who only smoked tobacco when chewing khat, called here concurrent smoking chewers (CSC) and to explore specifically the significant factor (s) of daily uptake of tobacco among CSC.

Methods: This is a cross-sectional study that recruited a purposive sample of 204 male khat chewers during random visits to khat sale outlets. Data collected via face-to-face interviews included items in demographic, socio-economic, khat chewing and aspects of tobacco use. Descriptive statistics and bivariate analyses were undertaken.

Results: Of the 204 recruited khat chewers 42 were CSC. The M±SD age of CSC was 37.64 ±14.01, 55% were unemployed and 52% with low level of education. The M±SD of severity of khat dependence (SDS-khat) among CSC was 5.38±4.38. Among the 42 CSC 60% smoked cigarettes, 33% waterpipe and 7% both waterpipe and cigarette smoking. With respect to pattern of use, 10% smoked tobacco and chewed khat daily (Group 1[Gp1]), 33% smoked and chewed 3 to 6 days (Group 2 [Gp2]) and 57% smoked and chewed 1 to 2 days (Group 3 [Gp3]). A significant differences in the scores of severity of dependence on khat across the three different khat chewing groups was observed (Gp1, n=4; Gp2, n=14; Gp3, n=24; χ²[2, n=42] =12.82; p=.002). Gp1 reported higher median score (11.00) for SDS-khat than the other two groups which both reported 7 and 2 scores respectively.

Conclusions: This preliminary study revealed variations in tobacco smoking uptake and methods of use. Daily tobacco smoking embedded within the khat chewing significantly associated with higher levels of SDS-khat. The underlying mechanisms of daily smoking and SDS-khat should be explored and focused on contextual factors (time of chewing, sleeping patterns and social setting).
Mapping the Effects of Khat (*catha edulis*) and Tobacco on the Human Brain: A biological illustration supporting the common pattern of dual substance use among khat chewers

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**Background:** The concomitant use of tobacco (cigarettes and/or shisha) during khat chewing sessions is noted throughout the growing literature and the addition of nicotine is said to increase the perceived high induced by khat’s primary phenylalkylamine components (cathinone, cathine, and norephedrine). However, our search of the literature failed to identify sources substantiating this common assumption or describing the mechanisms by which the two substances might interact biologically.

**Objectives:** To provide important insight into cross-cultural questions of addiction and its etiology by using separate neurological descriptions from the published literature on khat and tobacco to describe a model of biological effects for the two substances together.

**Methods:** A meta-analysis was done by searches on PubMed using search terms including “khat”, “nicotine”, and “effect on brain”, among others. Separate searches were performed for khat and nicotine. Relevant literature was also obtained from article bibliographies.

**Results:** Nicotine activates the learning pathway (hippocampus and amygdala), inducing the classical conditioning of environmental cues with the dopamine release from smoking. Khat activates the sympathetic nervous system by inhibiting the activity of norepinephrine transporters in the striatum and cerebral cortex, reducing norepinephrine reuptake. This activation of the fight or flight response induces the hyperactivity and high blood pressure from khat use. Both activate the mesolimbic dopamine reward pathway (ventral tegmental area and nucleus accumbens); the dopamine released in those areas induces pleasure, leading to addiction.

**Conclusions:** Nicotine curbs some of the negative side effects of khat such as hyperactivity and anxiety. Nicotine may enhance the addiction of khat through doubling the release of dopamine in the mesolimbic reward pathway. Also, the activation of the learning pathway by nicotine may have implications of the “psychic dependence of khat” (Kalix, 1990), which would explain how khat chewers who also smoke cigarettes demonstrate a higher dependence on khat than nonsmokers (Kassim, Islam, & Croucher, 2011).
Executive Functions Among Active Khat Users in Nairobi

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Background: The leaves of the khat tree (catha edulis) are widely consumed in East Africa and the Arab peninsula, especially in Ethiopia, Kenya, Yemen and Somalia. The current knowledge on the impact of long-term khat use on cognitive performance is still poor.

Objective: This pilot study was conducted to assess the effects of chronic khat use on neuropsychological test performance with particular focus on executive functions among Somali refugees in Nairobi, Kenya.

Methods: The study was conducted in October 2011 in a clinic in Eastleigh, a suburb of Nairobi, which is predominantly inhabited by Somali immigrants. Overall, this study has provided information from a sample of 48 patients of the clinic aged between 17 and 64 years and was assessed using CANTAB-based versions of the Cambridge Gambling Task and the Spatial Span Test as well as a three-disk tabletop version of the Tower of Hanoi. Khat chewers (33) were compared with a comparable khat-free controls (15) and a binge chewer group (12) was compared with non-binge chewers (21).

Results: Khat chewers made more total errors in reverse mode of the Spatial Span Test and needed more excess moves and more time to solve the Tower of Hanoi problem. Binge users made more total usage errors in clinical mode of the Spatial Span Test and needed more excess moves and more time to solve the Tower of Hanoi problem than the non-binge group. Differences in Cambridge Gambling Task measures were not significant.

Conclusions: Our findings are in keeping with evidence from other neuropsychological studies on khat users and on amphetamine patients, supporting the indications that long-term khat use causes impairments in specific cognitive functions.

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Effect of Ethanol and Khat (catha edulis forsk) on the Total Number of Purkinje Neurons in Early Postnatal Rats

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Background: The leaves of khat (Catha edulis) are found to have stimulating and pleasurable effect. The stimulating and insomnial effect is counteracted by ethanol intake.

Objective: To study the effect of ethanol and khat on total number of Purkinje neurons and volume of cerebellar cortex, animals of postnatal day 6 were used.

Methods: The animals were categorized into control, ethanol, khat and combination of khat and ethanol treated group and were deeply anesthetized and sacrificed after 30 days of treatment by perfusion with phosphate buffered formaldehyde. The Cavalier principle and physical dissector methods were used to estimate the volume of cerebellar cortex and numerical density of Purkinje neurons, respectively.

Results: The total number of Purkinje neurons was computed from these estimates. It was found that the volume of cerebellar cortex as well as the total number of Purkinje neurons of the ethanol treated animals were significantly (P<0.05) less than that of the controls and khat treated animals. No statistically significant difference was observed between the controls and khat treated animals. The numerical density and volume fraction of Purkinje neurons of ethanol treated animals were found to be significantly (P<0.05) greater than those of control or khat treated animals.

Conclusion and recommendation: The study depicted that PND 6 is an extremely vulnerable period during which the rat cerebellar Purkinje neurons are particularly susceptible to the effect of high dose of ethanol. Furthermore, the intake of khat and ethanol combination killed all the animals and needs further investigation.

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Correlates of Concurrent Use of Khat and Tobacco

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**Background:** Smoking is often used while khat chewing. However, characteristics of concurrent use of khat and tobacco has not been systematically examined.

**Objective:** To examine correlates of concurrent use of khat and tobacco.

**Methods:** Cross-sectional survey studies were conducted in Yemen using concurrent users of khat and tobacco, khat-only users, and nonusers. Both men and women were recruited to maximize generalizability.

**Results:** We found that the age of onset of khat use was earlier and reported hours of khat use was longer in concurrent users than in khat-only users. Earlier age when started khat chewing was related to greater number of cigarettes smoked while chewing. Approximately 70% of concurrent users reported that they initiated khat chewing prior to cigarette smoking. We also found gender differences in patterns of khat and tobacco use. Male concurrent users reported more frequent and intense tobacco use than their counterparts. While chewing khat, men were more likely to smoke cigarettes while women tended to smoke waterpipe. Finally, concurrent use was associated with impairment in working memory and subjective sleep quality.

**Conclusion:** These observations suggest that concurrent use of khat and tobacco may enhance health risks relative to the use of khat alone or nonuse of these substances.

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Targeting Khat Use - A Critical Discourse Analysis of Intervention Evaluation Reports Concerning Khat Use in the Scandinavian Countries

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Background: The European Union drugs action plan for 2009-2012 required Member states ‘to develop, as appropriate, services for minorities, including, for example, migrants’ (European Council 2008: C 326/13). This requirement highlights a focus on the implementation of drug prevention interventions and treatment services specifically adapted to ‘minority ethnic populations’. One such population is Somalis living in the Scandinavian countries, among which an uncertain proportion use khat.

Objectives: In this paper I discursively analyze evaluation reports about interventions targeting khat misuse in the Scandinavian countries (Denmark, Norway and Sweden). The main research questions are: Which intervention projects have been initiated? How is khat use constructed as a problem requiring intervention? How are the target groups constructed?

Methods: A literature review has been conducted to locate evaluation reports concerning projects targeting khat use. Seven reports were found, which might suggest a lack of focus on the khat issue; nonetheless, they are discursively interesting and could inform political decisions on the issue. The reports are analyzed using the critical discourse analysis approach, focusing firstly on the types of interventions, methods and involved actors, and secondly on how the reports construct the target groups and how the khat problem is constructed.

Results: Results and conclusions are preliminary as this is a work in progress. The projects are often initiated by local institutions (the municipality, the social services etc.), employing “community consultation”, which brings the issue of cultural competence to the forefront. Much focus is put on out-reach work and information dissemination via brochures describing the negative effects of the use.

Conclusions: The interventions targeting khat use in the Scandinavian countries mainly focus on informing the target groups about the negative physical and mental health effects of khat abuse. The problem of attracting khat users to seek treatment is seemingly great.

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Psychotherapeutic Interventions to Reduce Khat Consumption:
What We Know, What We don’t Know and What the Challenges are

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Background: Today it is widely accepted that prolonged and excessive khat use can lead to a dependence syndrome similar to amphetamine dependence. Despite the fact that „khat counselling“ has become a frequent service offered by local NGOs in some countries where khat is used most, little is known about the use of evidence-based psychological interventions available to treat khat addiction.

Objectives: To give an overview over psychological interventions used to reduce khat use. To develop recommendations which psychological interventions can be used to treat khat addiction and to develop suggestions for future research.

Methods: We reviewed the scientific and the grey literature on evidence-based psychological interventions that have been applied to khat addiction, on their effects and on any information that is important to plan such interventions. We also report additional analyses of previous treatment studies conducted by our group that focused on other psychological disorders than khat dependence to test possible effects on khat consumption.

Results: No study ever has reported on evidence-based psychological treatments for khat addiction. Very few addiction treatment centers, mostly located in Europe, offer treatment to khat users, but their problem is that khat users do very rarely utilize these services. Reason for this is probably the missing acceptance of typical addition treatment among khat users. Based on the literature, we expect that most khat dependent also have comorbid psychiatric disorders such as PTSD, depression or psychosis. In our studies, khat consumption among severely psychotic khat users could be reduced temporarily after a psycho-educative family intervention. In two other intervention studies among Somalis with PTSD some participants were khat users; we found inconsistent results on whether a PTSD-focused intervention also reduced the co-morbid khat consumption.

Conclusions: Psychotherapeutic interventions to treat khat dependence need to be urgently studied as well as expectations and needs of khat dependent individuals and their families. Integrated treatment approaches for khat dependence and comorbid disorders that are culturally embedded are highly recommended.
Effects of Qat on Lung Volumes & Ventillatory Capacity

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The aim of this study was to assess the effects of Catha edulis Forsk on the mechanical ventilatory response (Breathing Mechanics) of the casual Qat user.

Sixty healthy adult men who were casually chewing Qat leaves were randomly selected from 10 localities in Addis Ababa using inclusion and exclusion criteria. The mean age (±SD) was 31±2 years; their mean body weight was 70.8±3.8, their BMI was 22.3±0.6 kg/m². None were smokers and their frequency of chewing and ingestion of Qat leaves was on the average 1.7 times per week. All study subjects had normal history, vital signs, LFI (lung function indices) and ECG profile prior to the Qat session. Each of the subjects was given 200 gm of fresh “Beleche” Qat leaves which was chewed over a period of two hours.

Measurements of VCIN, FVC, FEV1, FEF and PEFR showed statistically significant differences between pre-test and post-test values (P<0.001). The mean value of the post-test FEV1% showed significant increment in only about 70% of the study subjects. The changes in VCIN, FVC, FEV1 and PEFR appeared to be relatively more consistent and significant (P<0.001).

The active ingredients of Qat have sympathomimetic effects on lung volumes and ventilatory capacity.

Key words:
Qat (Catha edulis Forsk; Casual Qat user; Breathing Mechanics; Sympathomimetic effect

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Khat – Analysis of biofluids and pharmacokinetics

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Khat use is an established habit and has a long tradition in a number of countries. Investigations of the short- and long-term medical consequences have been performed for a long time, but the pharmacological and toxicological potential of Khat ingredients still receives increasing attention by scientists. In order to correlate effects of Khat use the determination of its alkaloids might be necessary. A number of analytical methods have been published to determine S-(-)-cathinone, S,S-(+)-norpseudoephedrine (cathine) and R,S-(-)-norephedrine in the biological specimen blood, urine, saliva and hair.

The sensitive detection of the alkaloids and the differentiation of the diastereomers cathine (product of cathinone degradation in the plant) and norephedrine (also ingredient of the plant but also product of cathinone metabolism in man) require modern analytical equipment like gas or liquid chromatography coupled to mass spectrometry. However, analysis of Khat alkaloids is not part of the standard repertoire of analytical laboratories.

The few pharmacokinetic studies show that cathinone is extensively metabolized limiting its detection to less than 12 hours in blood and about one day in urine while traces may be present in saliva for and it is preserved in hair for a long time (each cm equals one month of growth). Excretion of cathine and norephedrine is much longer, traces can be detected in blood for about 3 days and in urine the vast amount of alkaloids is eliminated during the first day after use and low concentrations are detectable for more than 3 days. Since cathine and norephedrine are also eliminated fast from blood, no accumulation with daily use is expected. For the choice of sampling devices and storage of samples stability issues have to be considered. Stability of cathine or norephedrine is usually no problem, but cathinone is subject to marked degradation. It is recommended to use acidic conditions (below pH 5, e.g. blood sampling devices containing citric acid as anticoagulant) and/or freezing.

With regard to the choice of biological specimen, the different kinetics must be considered. Blood provides a means to correlate alkaloid concentrations with biological effects while urine, saliva or hair data just confirm Khat use. For the differentiation of chronic vs. episodic use or the dosages used, saliva and hair have been investigated. The results show an increase of alkaloid concentrations with dosage, but the correlations are weak. It therefore appears not possible to gain a reliable classification or estimation of Khat use habits from analytical data.

In Germany a forensic implication of Khat use is the driving under the influence of drugs (DUID). In the most of 71 cases, offenders stemmed from Somalia and Ethiopia. In 23% of cases, the police repeatedly caught subjects. From our experience Khat users exhibit psycho-physical deficits in about 50% of cases with impaired driving observed in about 25% of cases. However, there is no obvious correlation of impairment symptoms with alkaloid concentrations in blood. This indicates that not only acute use but also abstinence after repeated use might have a marked influence on users’ state of health and mind.

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Why Cathinone Derivatives (Might) Belong to the Most Popular New Psychoactive Substances (NPS)

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Background: Recreational khat use has never been an issue in developed countries, except for ethnic minorities of East African or Yemenite descent. Similar to the chewing of coca leaves, it is probably primarily the – culturally uncommon – mode of ingestion that prevents the drug from becoming popular among indigenous users. However, since a few years, newly synthesized derivatives of the main active compound, cathinone, have become popular among users of “legal highs”/ “research chemicals”.

Objectives: With data from different qualitative and quantitative social surveys, the presentation discusses prevalence and popularity of cathinone derivatives. These derivatives (with mephedrone being the most popular one) show powerful stimulant and empathogen pharmacological properties when ingested.

Methods: The authors’ research centre carried out several non-representative online surveys on the use of legal high products since 2011. Additionally to these data on prevalence and motivation for use, some representative surveys as well as some qualitative research projects will be taken into account.

Results: Mephedrone and methyleone were – at least until their illegalisation 2010/2012 – the most prevalent new psychoactive drugs consumed as pure substance. There are some more cathinone derivatives that have become popular in such networks of users. One reason for this popularity (particularly in contrast to other groups of “research chemicals”) is the effects of the drugs, which are described as quite unique (and, at the same time, show similarities to other ‘party drugs’).

Conclusions: Despite the bans that have been imposed over the most popular cathinones all over Europe in the last years, this substance group seems to remain significant within certain specialised groups of drug users. Similar to cocaine, powerful derivatives from the active substance of a mild herbal drug seem to establish within Western recreational drug users’ scenes.

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Changes in Cortisol Levels in Khat-Dependent Somali Refugees in Correlation with Traumatic Stress

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Background and Objectives: Over the past years, Somalis have been repeatedly exposed to war, violence, famine and displacement. As it is part of their cultural tradition, many Somalis use Khat. We wanted to find out associations of saliva-Cortisol levels, excessive Khat use and traumatic load among Somali refugees living in Nairobi.

Method: We compared male Somali Khat chewers (33) fulfilling the DSM-IV criteria for Khat dependence and comparable non-chewers (15) of the same age. In a detailed multimethod study we conducted a clinical interview, a series of neuropsychological tests and a neurophysiological assessment. In the clinical interview we assessed current Khat use patterns, severity of dependency and Khat use history, traumatic experiences, PTSD and psychotic symptoms. We used validated instruments from earlier studies in Somalia e.g. the Severity of Dependence Scale for Khat, the MINI International Neuropsychiatric Interview, the Somali version of the Posttraumatic Stress Diagnostic Scale and the Composite International Diagnostic Interview. Additionally we assessed five saliva-Cortisol levels at baseline and after every test trial.

Hypothesis is that we find changes in Cortisol levels after the clinical interview that assessed traumatic experiences as it has been shown in previous studies.

Results: The studied group showed high levels of dependency and traumatic load. Cortisol measurements showed a tendency of lower cortisol levels in Khat addicts, especially after the clinical interview. In an ANCOVA we found a significant interaction effect (p=.004) of Khat-chewing and traumatic load on Cortisol change. Cortisol-decrease and traumatic load correlate positively (p=.004) in Khat chewers in contrast to a non-significant negative correlation in the control group.

Conclusion: Results show that there is a hormonal change as a reaction to an emotionally challenging interview in Khat addicts with high traumatic load. Findings need to be replicated with a representative sample.
Effect of Khat (*catha edulis*) on Bronchial Asthma in Jimma University Spezialized Hospital, Adult Chest Clinic, Jimma Ethiopia

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Introduction: Asthma is a chronic inflammatory disorder of the airways. About 300 million people worldwide were affected by asthma leading to approximately 250,000 deaths per year. The active chemical present in Khat could have a bronchodilator effect like that of catecholamine. The present study aims at determining the effect of khat chewing on bronchial asthma.

Methods: A comparative cross sectional study was conducted in JUSH Adult Chest Clinic on 170 asthmatic patients with a 1.4 to 1 ratio of non-chewer to chewer between November 2010 and January 2010. Interviewer administered questionnaire, patient history and pulmonary function test using Spirometer was used to collect the data.

Result: Of 170 asthmatic patients, 72 were khat chewers and 98 were non chewers. Frequent asthmatic symptoms was seen on 23(31.9%) of chewers and 43(43.9%) of non chewer ($\chi^2=2.488$, $p=0.11$). A less frequent use of $\beta_2$ agonist was observed on 42(58.3%) of chewers and 53(54.1%) of non chewer patients ($\chi^2=12.678$, $p=0.12$). Less frequent night time awake and chewing status was found to be positively associated[AOD=2.633, CI (1.778,3.059)]. The mean predicted personal best of forced expiratory volume in one second (FEV₁%) for chewers and non chewer was 62% and 46% respectively while their PEFR% was 40% and 26% respectively. Based on Pharmacologic profile of cathinone particularly its half life time, percent predicted FEV₁ and PEFR were calculated among chewers themselves and there was significant difference in these parameters parallel to the time of chewing before spirometry.

Conclusion: In conclusion, apart from psycho stimulating prosperities, khat has moderate potential benefit for the improvement of episodes of asthma attack. This study showed that chewer asthmatic patients had relatively better PEFR and also relatively lesser recurrent night time awake due to asthmatic attack.

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Notes