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The assessment of khat-related deaths in the UK

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Speaker's experience

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Introduction

During the past 20 years or so, more has become known about the properties of khat, its pharmacology, physiological and psychological effects on humans. Khat consumption has adverse health consequences including myocardial infarction, liver failure, depression, psychoses, and dependence. However, its reputation of social and recreational use in traditional contexts has hindered the dissemination of knowledge about its detrimental effects in terms of mortality.

This paper focuses on this particular deficit, briefly outlining the types of mortality associated with the trade and use of khat. With khat being increasingly brought under domestic regulation in many countries, and its legal status being considered in others, it is important that both these dimensions need to be understood.

Taxonomy of khat-related deaths

No known published reviews of or statistics on khat-related mortality - an important gap in the knowledge-base.

A literature search of all relevant databases as well as the Internet to identify relevant reports and information on 'khat-related' mortality was undertaken.

Need media reports to for deaths associated with khat trade and consumption; not in academic databases.

This process identified a range of deaths that can be directly and indirectly associated with khat, some of which can overlap.

To help understand the dimensions of the phenomenon it is necessary to derive themes or 'motifs' from the results (Table 1).

Table 1: Taxonomy of khat-related deaths

Directness	Type of association	Mechanism	Example
Trade-related			
	Cultivation/production	Poisoning	Fertiliser/Pesticide not washed before consumption
		Disputes between actors	Disagreement over wages => homicide
	Transportation	Fatigue	Long hours and driving at high speed => loss of concentration (can be in association with khat use to keep awake) leading to accidents
		Loss of concentration	Distraction whilst preparing khat for chewing whilst driving => accidents
		External factors	Bad weather conditions/ mechanical failure => plane crashes
	Distribution/marketing/wholesale	Disputes between actors	Fighting over 'turf' => violence and homicide
		Disputes between actors	Refusal to do business => violence and homicide
	Retail	Disputes over price	Homicide

Taxonomy of khat-related deaths

Directness	Type of association	Mechanism	Example
Consumption-related (medical)			
	Physiological	Mechanical	Choking on leaves/twigs or airway obstruction => asphyxia or cardiac arrest
		Toxicity	Myocardial infarction => fatal heart attack
			Liver failure
	Neurological	Lack of motor co-ordination, shaking	Reduces control => accidents
		Eye-sight problems	Impairs sight and focus => accidents
	Psychopathological	Causing and/or exacerbating psychosis and/or depression	Suicide and/or homicide, accidental overdose
		Impaired judgement/ assessment of risk => accidents	Road traffic accident
			Fall from height
	Other medical contributory factors	Used with other psychoactive substances and/or positive toxicology	Role may not be clear

Taxonomy of khat-related deaths

The contribution of khat to deaths is varied; and in some cases can be difficult to categorise.

Deaths associated with trade, marketing, wholesale and retail, can equally occur with any other illicit substance.

Their inclusion here is deliberate: they are part of the wider pattern of mortality associated with the consumption of khat.

The association of khat with psychiatric disorders or psychopathological factors is evident in some cases, contributing to suicide and even homicide.

The physiological effects of khat consumption are quite clear in a number of cases.

National Programme on Substance Abuse Deaths (np-SAD)

np-SAD gets information from coroners and other sources across the UK on a voluntary basis on drug-related deaths and deaths of addicts.

Since 1997 details of 20,000 deaths received.

The average annual response rate is up to 95% (Ghodse et al., 2009).

Case definition - at least one of the following: (a) presence of one or more psychoactive substances directly implicated in death; (b) history of dependence or abuse of drugs; (c) presence of controlled drugs at post-mortem.

Method

We defined deaths related to khat as the inclusion of the words ‘qat’, ‘khat’, cathine, cathinone, norephedrine or (nor)pseudoephedrine in the cause of death, post-mortem drugs, verdict, and incident description sections of the coroner’s report.

The presence of such compounds in the toxicology results was used in conjunction with other information to define a khat-related death, since norpseudoephedrine is also a metabolite of pseudoephedrine which is a precursor for methylamphetamine and can therefore be derived from a substance that is not cathinone.

Data sources

Case identification - quasi 'snow-ball' cluster sampling approach.

5 notified as part of the normal surveillance programme. Tox investigations for 2 of these done by SGUL Forensic Toxicology Service. Examination of their records revealed 3 more deaths.

Members of London Toxicology Group asked if they knew any cases => information on onecase.

4 were identifiable through press reports; info got from coroners.

Information extracted using np-SAD data form. Details of individual's background, medical & psychiatric history, PM & tox reports obtained/scrutinised at coroner's office by author.

Enquiries were also made of UK General Register Offices & SCDEA to ascertain any other cases – none identified.

Results

The results of the np-SAD study are summarised in Tables 2 and 3.

Table 2: Main characteristics of 12 khat-related deaths, UK, 2004-9

Characteristics	*Frequencies*
Year of death	2004 = 2; 2005 = 3; 2006 = 4; 2007 = 0; 2008 = 2; 2009 = 1
Geographical area	East London = 1; West London = 2; North London = 7; Hampshire = 1, Cardiff = 1
Gender	All male
Marital status	Married = 3; with partner = 1; divorced = 1; separated = 1; single = 1; not known = 5
Age at death (years)	Mean = 36, range = 22 to 47
Ethnicity/Nationality	Somali = 10; Eritrean = 1; Polish = 1
Length of UK residence (years)	3 = 1; 5 = 1; 11 = 2; 15 = 1; Not known = 7
Occupation	Unemployed = 5; manual employed = 4; student = 1; invalidity benefit = 2
Living arrangements	Alone = 3; partner & children = 3; self & children = 1; with partner = 1; with sibling = 1; with friends = 1; psychiatric in-patient = 1; not known = 1
Significant medical history	No = 5; yes = 3; not known = 4
Known psychiatric history	Yes = 3;
Known khat using history	Yes = 8
Evidence of using khat	Yes = 9; no = 3
Place of death	Home = 4; hospital = 4 (inc. 1 following traffic accident); railway station = 2; street = 1; outside flats = 1
Coroner's verdict	Self-harm = 2; suicide = 1; open = 1; accidental = 3; misadventure = 1; non-dependent abuse of drugs = 1; narrative = 2 (inc. 1 natural causes); abuse of drugs and natural causes = 1

Results

Case	*Role/association*
1	Paranoid psychosis associated with history of khat use => traumatic suicide (none in body at death)
2	Possible suicide/accidental fall whilst judgement impaired (found in body)
3	Possible history of excessive use => traumatic murder and traumatic suicide
4	Paranoid schizophrenia exacerbated by khatting => accidental overdose
5	Ingestion of khat => high norephedrine levels => left ventricular failure => pulmonary oedema
6	Long term khat use => hepatic necrosis => sub-fulminant liver failure
7	Drug-induced psychosis/psychosis exacerbated by use of 'skunk' and khat over long period => traumatic suicide
8	Ingestion of khat (possibly no longer active), alcohol consumption => intoxication, impaired judgement/lack of co-ordination => traumatic road traffic accident (pedestrian)
9	Alcohol and khat in system => impaired judgement/co-ordination => loss of control of vehicle => traumatic road traffic accident (driver)
10	Overdose of injected heroin, but khat also in system
11	Abused khat => jaundice, night sweats, pyrexia => sub-acute liver failure
12	Excessive use of khat => fulminant hepatic necrosis => required liver transplant (failed)

Results

The contribution of khat was varied. 50% traumatic in nature with external causes of death.

In 1 case, khat found in mouth, oesophagus & stomach but role unclear; decedent's khat-induced psychosis may have contributed to/or influenced fall from a height, or impaired judgement?

Impaired judgement due to use of khat & alcohol possibly instrumental in 2 cases where decedents fatally injured by contact with motor vehicles. Lack of motor co-ordination, impaired vision (Le Bras and Frétillère, 1965) or ability to judge speed properly (Khattab and Amer, 1995) may have contributed to the accidents.

'Skunk' use & khat contributed to problems experienced by one case. In another case khat present along with fatal levels of heroin.

Results

Khat associated with psychiatric conditions in 4 cases (3 suicides + 1 murder), 1 accidental overdose. Earlier UK cases (Busby, 1987; Pantelis et al, 1989).

Physiological effects of khat consumption very clear in 4 cases. ?First reported fatalities due to khat toxicity since Heisch (1945).

Norephedrine/norpseudoephedrine producing adrenaline-like actions => increased likelihood of myocardial infarction => left ventricular failure and pulmonary oedema (Al-Motarreb et al. 1997, 2002, 2005; Croles et al., 2009; Health Canada, 2007).

Khat toxicity in 2 cases => hepatic necrosis and sub-fulminant liver failure; and in 3rd to sub-acute liver failure, in the presence of auto-immune hepatitis. These presentations consistent with recent findings for hepatitis (Brostoff et al., 2006; D'Souza et al., 2006) and liver disease (McCune et al., 2007).

Results

All male, aged 22-47 (mean = 36).
11/12 of East African descent: 10 Somali, 1 Eritrean.
However - one Polish: suggesting possibility of spread of khat use outside traditional ethnic khat-using populations.
All lived in areas with immigrant populations.
Length of residence in the UK 3-16 years (where known). 2 cases domiciled in UK because of the civil war in Somalia.

Case demographics are typical of khat users in the UK - relatively young, unemployed, Somali males, living with significant others. However, surprising no reported fatalities involving Yemenis.

Review of khat in the UK

Khat is currently imported and used legally in the UK.

Cathinone and cathine are controlled substances under Class C of the UK Misuse of Drugs Act 1971 by virtue of Schedules 1 and 3 respectively of the Misuse of Drugs (Amendment) Regulations Act 1986.

An offence is committed if these substances are extracted from the plant. However, there have been no successful prosecutions to date.

Khat is licensed under the Medicines Act 1968 as a medicinal product but never imported in that way. Imported legally when declared as a vegetable, is liable to Valued Added Tax!

UK review

In 1988 the independent Advisory Council on the Misuse of Drugs (ACMD) considered the khat issue at Government's request. It concluded that, based on available evidence, the plant did not warrant control under drugs legislation.

February 2005 the drugs Minister asked the ACMD to advise the government as to the current situation in the UK and the risks associated with khat use. The report reviewing the scientific evidence concerning levels of khat use, risks, and current treatment options published January 2006 (ACMD, 2006).

ACMD recommended that khat should not be controlled under the 1971 Act. Use of the substance is limited to specific communities within the UK, and had not, nor did it appear likely to, spread to the wider community. However, the ACMD recognised that use of khat has detrimental effects and that its use should be discouraged.

UK review

Home Office has kept a “watching brief” on khat.

It is understood that a further assessment will be undertaken shortly and that, in the meantime, more up-to-date evidence is being collected. It is intended that the np-SAD will provide the results of its research on khat-related mortality, and other aspects of khat use, to the Home Office so as to help inform the decision-making process.

Discussion & conclusions

Death can occur at any stage from the cultivation of khat to its consumption. Some of the factors can occur in combination, and it can be difficult sometimes to disentangle them.

Apart from poisoning from insecticide, traumatic deaths can be a feature of the cultivation, transportation, and trading activities undertaken by distributors and sellers. Violence can also occur in other settings.

Psychopathological effects – (i) impaired judgement leading to accidents and violence, (ii) causing or exacerbating psychoses or causing depression leading to suicide and even homicide. Physiological effects encompass (a) mechanical problems e.g. choking on pieces of the plant.; and (b) toxicity (i) causing heart problems leading to fatal heart attacks, and (ii) liver failure.

Discussion & conclusions

These UK cases illustrate some of the key issues related to the consumption of khat:
(a) psychological effects –
(i) impaired judgement leading to accidents and violence,
(ii) causing or exacerbating psychoses or causing depression leading to suicide and even homicide;
(b) physiological effects – toxicity is the primary concern here
(i) causing heart problems leading to fatal heart attacks, and
(ii) liver failure;
(c) mechanical problems e.g. choking on pieces of the plant; life-style aspects - part of the culture and thus being found in post-mortem toxicology.

Discussion & conclusions

This review of the UK experience and exploration of international research has demonstrated a lack of documented cases in the literature, as well as nothing by way of quantitative data.

These gaps in knowledge need to be filled.

This will lead to a much better understanding of the potential risks of death associated with khat use, based on empirical observation.

Need to identify and map sources of information on khat-related mortality, collate what is currently known in terms of statistics, and identify what gaps exist and how they might be filled.

An improved information-base enable the estimation of the possible numbers at risk of dying from the trade and use of khat.

Discussion & conclusions

Routine and systematic research of khat-using populations in respect of morbidity and mortality arising from khat is needed.

Only then can the best methods of supplying preventative and therapeutic interventions be considered in an informed way.

Meantime, dangers arising from khat use and its psychoactive constituents need to be brought to the attention of those in producing/growing countries, and those countries/regions that have become hosts to ever-increasing communities from these countries.

This will need to be specifically focused on target groups using a variety of media, including a variety of languages.

Discussion & conclusions

Lack of negative health results for khat in the literature should not lead to complacency or an assumption that khat use is free from toxic consequences. This absence of negative reports is due to a lack of population-based studies.

Whilst anecdotal reports are informative, systematic investigations using surveillance methodologies are needed to determine the incidence and prevalence of ill-effects of khat use.

The fatal case studies detailed above need to be borne in mind in future reviews of khat – but at the national and international levels - and the physiological and mental health risks associated with its use. These risks appear to be greater than previously realised. Something for policy-makers to chew on?

Discussion and conclusions

Risks appear to be greater than previously realised.

Lack of negative health results for khat in the literature should not lead to complacency or an assumption that khat use is free from toxic consequences. This absence of negative reports is due to a lack of population-based studies, particularly in respect of the toxicology of khat.

Whilst anecdotal reports are informative, systematic investigations are needed to determine the incidence and prevalence of ill-effects of khat use. Only then can the best methods of supplying preventative and therapeutic interventions be considered in an informed way.

Discussion and conclusions

Dangers arising from khat use hat and its psychoactive constituents need to be brought to the attention of those in producing/growing countries & countries/regions that have become hosts to ever-increasing communities from these areas.

Information should be specifically focused on target groups using a variety of media, including a range of languages.

There is also a need to consider the dissemination of such information to non-traditional groups that appear to be emerging as consumers of khat e.g. those turning from the use of synthetic substances to 'natural' herbal substances.

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