HEALTH AND SOCIO-ECONOMIC HAZARDS ASSOCIATED WITH KHAT CONSUMPTION

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The consumption of the stimulant leaf Khat (Catha edulis Forsk) is widespread in several countries of East Africa and the Arabian Peninsula. The leaf comes from a small evergreen shrub that can grow to the size of a tree. Young buds and tender leaves are chewed to attain a state of euphoria and stimulation. Khat leaves contain cathinones, an active brain stimulant that is similar in structure and pharmacological activity to amphetamines. Like amphetamines, Khat ingestion in low doses results in decreased appetite, euphoria, increased intellectual efficiency, and hyperalertness.

High doses and chronic use of Khat can cause more serious adverse neurological, psychiatric, cardiovascular, dental, gastrointestinal and genitourinary effects. Besides damaging health, Khat has adverse socio-economic consequences effects on many other aspects of life including the loss of thousands of acres of arable land and billions of hours of work.

The purpose of this review is to describe briefly the adverse consequences of habitual chewing of Khat on health, and help educate the general public. The study is based on literature review that includes internet search and journals.

Key Words: Khat, Health, Social, economy, Saudi Arabia.

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INTRODUCTION

The earliest reference to Khat (Catha edulis Forsk) appears to have been made around 973–1053 AD by Al-Biurni, who meticulously compiled information on all contemporary drugs, and what he called Khat, an import from Turkestan. It was used to relieve biliousness and cool the stomach and liver.1 Reports indicate that reference to Khat may be as early as 1332 AD in an Arabic manuscript preserved in the Bibliotheque National in Paris.2 In the 13th century, physicians prescribed Khat to soldiers to reduce fatigue. Khat chewing as a recreational habit may have begun in the Southern Red Sea region prior to the 14th century.

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It was brought over 700 years ago to Yemen, where it was chewed by merchants to relieve boredom. The historical background of the origin of Khat, its composition and action, pattern and extent of use, and psycho-physical and social effects, have been reviewed elsewhere. Since then, with the development of Science and Technology, a large number of studies have been conducted to determine the effects of Khat in different organs and systems in the body. Health and socio-economic hazards are reviewed again for medical education, community health education, international readers and interested researchers. First accounts of its effects appeared more than seven centuries ago in an Arabic medical textbook in which the leaves were recommended as a cure for depression. The earliest scientific report on Khat presented in the western world, in contrast to opium and cannabis, stated that it produced a mild form of antisocial behavior, and was more akin to amphetamine or caffeine-type substance. In the eighteenth century, Niebuhr reported that he 'never saw the Arabian use opium like the Turks and Persians, and instead of taking this gratification they chew kaad (Khat)'. The same can be said today of communities living in Djibouti, Somalia and Yemen Arab Republic. However, with the improved cultivation of the Khat plant, and easier and more rapid communication between countries, it has been observed that Khat-chewing in the majority of these countries has reached serious epidemic proportions.

**Epidemiology**

The cultivation and consumption of the stimulant leaf Khat is widespread in several countries of East Africa and the Arabian Peninsula. Khat (pronounced cot) has other names and spellings: Khat, kat, chat, quat, catha, tschat, miraa, African salad, African tea, Abyssinian tea, kuses-salahin, and tohai. The leaf comes from a small evergreen shrub that can grow to tree size. Khat originated in Ethiopia and spread through Kenya, Somalia, Djibouti, Uganda, Tanzania, Zimbabwe, Zambia, South Africa, and Yemen. Young buds and tender leaves are chewed to attain stimulation and a state of euphoria. Although Khat is freely obtainable in these regions, its use in western countries such as the United Kingdom, Canada, and the United States has recently become restricted, and is now classified as a controlled substance of abuse.

Nonetheless, people from these regions (Somalis and Yemenis) continue the habit even after immigration to the West. The habit of chewing Khat has reached the western world because: (1) A significant number of people from developing countries including individuals from Khat cultivating regions have immigrated to the west. (2) Khat can be easily transported to western countries where a large number of immigrants from the Horn of Africa and the Arabian Peninsula live.

The international organizations were confronted with the problems associated with Khat as early as 1935. Significant efforts and progress have been made since then to understand the pharmacology of Khat. The World Health Organization (WHO) played an important role early on in encouraging and funding scientific studies designed to understand the active constituents of Khat and the health problems associated with its use. Because of their efforts, we now understand the pharmacology of Khat and the attendant health and human problems with its use. It has been reported that Khat trees are being cultivated in the Southern region of the Kingdom of Saudi Arabia adjacent to the Yemen border, and that the leaves are being used in the Jazan region. The Khat issue has been addressed by the authorities in three phases: Firstly, before 1376 H/1956G, Khat was banned and fines were imposed on its smuggling; secondly, in 1376 H/1956G the Kingdom’s Mufti ruled Khat as forbidden (Haram) and forbade its cultivation, importation and use. Thirdly, 1391 H/1971G a Royal Decree was issued banning the cultivation of Khat, sale and its use because it was legally considered as narcotic. Moreover, in the Kingdom the Khat issue was addressed through development and a national corporation established with offices in Riyadh and in Jazan. The Khat Committee implemented many development programs in the mountainous areas of the Jazan region.

Khat is banned in Saudi Arabia, Egypt, Morocco, Sudan and Kuwait. With the increasing migration of people from Khat cultivating areas, Khat (Arabic tea/salad, Khat, chat, miraa) has arrived in the west and cases of Khat-induced psychosis are now recognized. It is banned in the US and some European countries. Its importation is controlled in Australia under the Customs (Prohibited Imports) Regulations. A license issued by the Therapeutic Goods Administration allows
importation of up to 5 kg of Khat per month, per individual for personal use.

Khat was freely available in Saudi Arabia prior to 1971, when it was classified as a narcotic and decreed illegal (i.e., further cultivation, commercial activity and personal use of Khat was banned). The basis for this change in law was the local religious teaching (Islam), which has a strong utilitarian approach to harm to the individual or the public. The Saudi government has meted out very severe punishments and penalty to users and smugglers. This has been generally accepted by the population, with the exception of the people in the southwestern region of Jazan. In this area, which shares a border with the Yemen, Khat has been cultivated for centuries and its use is still widespread in the city of Jazan and the surrounding rural areas.

The Saudi government has enacted a further law prohibiting the expansion of Khat cultivation within the Faifa mountain area (near to Jazan city). This area is now controlled and supervised by the Ministry of the Interior under a local administration called the Faifa Development Authority (established 1978). The authority offers financial and practical assistance to Khat cultivators to develop alternative crops, such as fruit and coffee trees. With the assistance of Al-Mugahidin soldiers, the authority now guards the mountain 24 hours a day and keeps a close watch on people and cars coming from the mountain in order to detect Khat smugglers. However, control is ineffective in some areas as Khat is still used privately in houses and in the Faifa Mountain, where visitors from Jazan city and other towns come and chew Khat as much as they wish and leave without taking any with them. The main problem with Khat use is the amount of time users spend (waste?) chewing it and energy expended on its cultivation.

Because of the underlying factors of unemployment and cultural alienation, legislation to combat the socio-economic problems resulting from Khat use by the people of the Jazan region would be counter-productive and may cause an escalation of illicit drug use in this community. Two measures of strategic harm reduction response would be more appropriate: (a) Address the underlying social problems of unemployment, poor housing, cultural alienation and promote positive measures for community development. (b) Develop a health education program to raise awareness (i.e. publication of health guidelines, leaflets, and peer support).

**COMPOSITION (PHARMACOLOGICAL INGREDIENTS)**

Because its leaves contain chemicals that are mildly stimulating, people in the region from Tanzania to Yemen chew Khat. Khat leaves contain three alcohohes, cathine (C6H5CHOH(NH2)CH3), cathinine, and cathidine, as well as sugars, tannins, and vitamin C in great amounts (324 mg/100 g vs green [bell] pepper's 120 mg/100 g). The World Health Organization (WHO) asserts that Khat has amphetamine-like properties, and categorizes it as a separate drug group in which it is the sole member.

In Halbach’s reviews of the pharmacology and clinical actions of Khat, he concluded that its effects reflected largely its sympathomimetic ingredients. He postulated that the spectrum of its actions lay between amphetamines and caffeine. This premise was based on the predominant component identified to date as norpseudoephedrine (cathine) and alphamino- propiophenone (cathinone) rather than knowledge of all of its ingredients and their pharmacologic manifestations. Moreover, the data cited covers a span of two decades and predates the more recent identification of alpha- and beta-adrenergic receptors, blockers, and modifiers. In the absence of more definitive information, one can only cite clinical observations and continue with hypotheses concerning clinical disorders in the users of Khat.

**SOCIO-ECONOMIC HAZARDS**

a. Social

Takhzeen Al-Khat (Khat chewing) is a common habit in East Africa, South Saudi Arabia and among Yemenis. This habit involves picking tender leaves of Khat, putting them into one side of the mouth, chewing for a while and storing the chewed leaves in the same side of the mouth. People chew Khat to get psycho-stimulation effect in the form of euphoria and excitement resulting from the cathinone contents. In the traditional social setting, the chewers meet in a house some time after mid-day, usually bringing their own supplies. The chewers lean on three or four specially made large cushions. Each side of the room accommodates six to ten persons, and occasionally up to twenty. They set up one or two communal tobacco pipes or "hubble-bubbles" stands in the center. Each stand consists of a tobacco bowl, a 3- or 4-foot high metal pipe, a
water filter, and a 20-foot long flexible tube. The tobacco is lit with a layer of charcoal, and the flexible tube is passed from person to person. Each person limits himself to a few puffs since excess produces dizziness, tremulousness, palpitations, and severe nausea. During these Khat sessions, drinks such as cola, weak black tea, or just cold water are available.

The guests are welcomed and carefully seated according to their social position. They then begin to masticate the leaves thoroughly one at a time while they engage in discussions and social interactions. During these sessions, the leaves and the bark of the plant are chewed slowly over several hours and the juice of the masticated leaves but not the residue is swallowed. Khat contains alkaloids of the phenylpropylamine type of which the main psychoactive constituent is S-(−)-aminopropiophenone (cathinone), together with the two words less psychoactive phenylpropanolamine diastereomers S,S-(+) and R,S-(−) norephedrine. After the Khat leaves are chewed, the guests stay on for most of the afternoon, engaged in animated discussions often on matters of general interest, such as community affairs. From this point of view, Khat can be seen as a means of promoting social interaction. Besides these traditional forms of consumption, Khat is nowadays also chewed by individuals idling on streets in Europe where it is accompanied sometimes by the consumption of alcoholic beverages and other drugs at gatherings without the restraint and the structure of the setting described above.

There are claims of positive physiological aspects to Khat chewing: strong energizing effect of workers, students, and merchants. Elderly people seem to benefit greatly. In the villages, many old people, who usually chew moderately, are still able to work in the fields. The aged do not sit idle in northern Yemen. For Yemenis, however, Khat may be less of a drug than a medium for socialization. It dissolves the social barriers that divide Yemenis, or separate Yemenis from foreigners. For example, Yemenis freely asked the foreign author of this paper if he had ever chewed Khat. The leaves would be offered regardless of the response. The host is delighted if the offer is accepted. Students are frequent users of Khat. With improvement in education, the new generation of students favors a ban on Khat even though they continue to chew the leaves before examinations. In Ethiopia and neighboring countries, it is commonly used in social gatherings just as alcohol consumption is used in the west. Even during the last campaign in Somalia, against the use of Khat, some writers used it to help them prepare anti-Khat articles!

b. Economic

Prior to the expansion of the Khat trade, coffee was the biggest crop in Yemen. Yemeni coffee trade peaked in the 17th and 18th centuries, but began to decline as a result of the competition of coffee production in Indonesia, South America, and East Africa. Now, as a result of national and regional demand, Khat is replacing coffee crops. Currently, in Yemen, estimates suggest that one-half to two-thirds of their arable land is being used for the cultivation of Khat, largely because farmers earn five times as much for Khat as for other crops, including coffee. In fact, in 1992, Khat "held its price, while coffee slumped." Khat is also Ethiopia's fastest growing export. In Ethiopia, over 93,000 hectares is devoted to Khat production, the second largest crop in terms of land area (coffee is first). Though Khat cultivation has taken over arable land because of its value, as a crop it is "non-nutritious and unproductive."

The replacement of coffee and other crops for Khat would be detrimental to the economy because it drains foreign investment. Primarily, only local, regional governments and a growing market in Britain import Khat. Khat is illegal in the United States, Holland and much of Europe. Despite the regional parameters of the Khat trade, an extensive and efficient system of production and distribution has arisen for the industry. Some argue that Khat harms the economy by the loss in production as a result of laziness and absenteeism. Workers go to lunch and engage in Khat sessions, and do not return to work. A 1973 estimate suggests that over 4 billion hours of work a year were lost as a result of the Khat habit. This claim is widely disputed now. In 1967, the Marxist government of South Yemen attempted to do away with Khat because of the laziness it allegedly inspired. There was much resistance to a total ban. Since prohibition was not feasible, the government placed a heavy tax on the narcotic. Generally, an increase in taxes is successful in reducing the use of such substances as nicotine, but surprisingly, the Yemenis paid these taxes and continued their habit!
Khat is also cited as part of the problem for the economies of Ethiopia, Yemen, Djibouti and others, partly because, as statistics suggest, nearly every family spends one third of its disposable income on Khat.

HEALTH HAZARDS

a. Cardiovascular System
Cardiovascular effects of Khat chewing in humans include elevated blood pressure and heart rate. In anaesthetized dogs to which Cathinone was administered, increased blood pressure, heart rate and cardiac contractile force and positive inotropic and chronotropic actions in isolated atria have been reported. In its analysis of Khat, the WHO argues that chronic Khat-chewing can cause hypertension in young adults, with a spontaneous regression once consumption ceases.

We recently reported an increased incidence of acute myocardial infarction (AMI) in Yemen, which was associated with Khat chewing. There was also a difference in the diurnal pattern of AMI presentation between Khat users and non-Khat users. In non-Khat users, the peak presentation of AMI is in the early hours, whereas in Khat users it is shifted to the late afternoon and evening, which coincides with the Khat chewing session. Al-Motrreb et al (2004), reported that Khat chewing was significantly higher among the AMI case group than control group (OR= 5.0, 95% CI 1.9–13.1). A dose–response relationship was observed, the heavy Khat chewers had a 39-fold increased risk of AMI. In a recent study, Al-Motrreb and Broadley demonstrated that cathinone, the active central nervous system stimulant, has vasoconstrictor properties in the coronary circulation and in a major conducting vessel, the aorta. This vasoconstricting action is not unlike that of amphetamines as it does not appear to be due to an indirect action by the release of noradrenaline from sympathetic nerve endings (not blocked by cocaine) or a direct action on α1-adrenoceptors (not blocked by prazosin). The mechanism by which cathinone causes this vasoconstriction remains unclear and whether it is due to the release of an alternative endogenous vasoconstrictor to noradrenaline, such as, endothelin or angiotensin is unknown. The vasoconstrictor action of cathinone explains the increase in blood pressure caused by cathinone in anaesthetized animals and humans. The coronary vasoconstriction by cathinone could explain the increased incidence of myocardial infarction in Khat chewers that is associated with the periods of Khat chewing. The cathinone derived from the Khat could induce coronary vasoospasm which may occlude coronary arteries sufficiently to precipitate myocardial infarction. Khat produces cardiovascular effects including tachycardia, palpitation and increased blood pressure within 15-30 minutes of ingestion. Chronic use of Khat has also been associated with hypertension contrary to some consumers' claim that its use is associated with antihypertensive effect.

b. Psychological and Neuropsychiatric
A recent study described a positive association between the occurrence of anxiety and depression in Khat users. There have been sporadic reports of a possible association between Khat use and the occurrence of hypomania, aggressive behavior or psychoses among users. Subjective experiences of Khat use are positive when small amounts are consumed. There is a feeling of well-being, a sense of euphoria, excitement, increased energy levels, increased alertness, increased ability to concentrate, improved self-esteem and increased libido. In addition, there is an enhanced imaginative ability and capacity to associate ideas, improvement in the ability to communicate and a subjective improvement in work performance. When chewing ceases, unpleasant after-effects such as insomnia, numbness, lack of concentration and low mood tend to dominate the experience. Some chewers also reported unpleasant effects during the chewing, describing anxiety, tension, restlessness and hypnagogic hallucinations.

Objectively, those who chew Khat show a range of experiences, from minor reactions to the development of a psychotic illness. Minor reactions being over-talkativeness (chatty), hyper activity, insomnia, anxiety, irritability, agitation and aggression. Broadly, the main psychiatric manifestations linked to the use of Khat are a short-lived schizophreniform psychotic illness, mania and, more rarely, depression. On occasion, these presentations are associated with episodes of self-inflicted harm or causing harm to others. Owing to the mode of consumption, the dose of Khat tends to be self-limiting, unlike amphetamines, which are available in a pure form for oral or parenteral administration. Therefore, toxic psychosis as a result of excessive use is much less frequent with Khat than with amphetamines.

The survey was performed in 2000/2001, in different zones including three urban and three
rural areas to show associations between psychological symptoms and Khat use in the Yemeni population. This cross-sectional survey was carried out in 800 adults (15-76), both male and female, mainly urban populations of students, state employees and housewives. The Symptoms Checklist-90 (SCL-90) containing 90 items, which cover nine scales of the following domains was used: somatization, depression, anxiety, phobia, hostility, interpersonal sensitivity, obsessive-compulsion, hostility, paranoia and psychoticism. Details of Khat use and socio-demographic data were collected. At least one life-time episode of Khat use was reported in 81.6% of men and 43.3% of women. Male users tended to use it more frequently. The incidence of adverse psychological symptoms was not greater in Khat users. In fact, there was a negative association between the incidence of phobic symptoms and Khat use. Though Khat use is very common in the Yemeni population, particularly in men, it is not associated with adverse psychological symptoms.

Though intoxication with Khat is self-limiting, chronic consumption can lead to impairment of mental health, possibly contributing to personality disorders and mental deterioration. Conversely, Dhadhphale & Omolo (1988) reported no increased long-term psychiatric morbidity among Khat users. It interferes with sleep, so most users can estimate the quantity they need to produce the desired effects without getting insomnia. The beginners always chew less. Tolerance then develops, and most chronic chewers cease to experience insomniac effects.

In the UK, a commercially available biochemical test to detect Khat constituents in the urine is used to screen a suspected Khat-induced state. Initially, a rapid screen by immunoassay detects amphetamine-related compounds. Then gas chromatography mass spectrometry is performed. This cannot detect cathinone directly, but a positive result indicates the presence of norephedrine, a cathinone metabolite. The test gives a positive result for up to about 48 hours after consumption of Khat. This is dependent on many factors. For example, chronic consumption as opposed to a single episode of use, the quantity taken, the user’s metabolism, and dilution of urine following consumption of fluids. The test is highly sensitive, but not highly specific, because there are some cross-reactions with other metabolites. However, in the context of the clinical presentation together with the history of Khat consumption, the urinalysis is a useful additional test. In many areas, urine testing is not available, and an accurate history of (increased) Khat consumption prior to the onset of clinical symptoms is equally important. Yemenis invariably deny Khat's adverse health effects, but do freely admit that they have an insomnia-caused exhaustion that partially impairs their ability to work the following day. This impairment may be exacerbated by an anorexia-induced hypoglycemia that may result from chewing Khat.

c. Oral and Dental effects
Dental cavities are rare among users of Khat in Yemen, but this may be attributable to the low consumption of sweets, fluoride water, and the use of a primitive toothbrush to clean the teeth. Stomatitis is common as people begin to use Khat and persists with chronic use, producing local irritation and secondary infection. In both instances, the concomitant smoking of tobacco may contribute to the stomatitis. Furthermore, in the rural areas, stomatitis may be the result of vitamin deficiency. Al-Hebshi and Skaug assessed and compared the prevalence of 14 selected periodontal bacteria, associated with periodontal diseases or periodontal health, in sub- and supragingival plaque of Khat chewers and non-chewers. Since Khat chewers predominantly used the same side of the mouth to chew, comparison of the microbiota in the different sides of the mouth similar to the split-mouth technique could also be performed. Al-Hebshi and Skaug (2005) found that 68% of the Khat chewers used their left side to chew and chewing induced a microbial profile not incompatible with gingival health. Others have reported oral side effects including periodontal diseases, dental caries, temporomandibular joint dysfunction and keratosis of buccal mucosa. Oral cancers have been observed in some population groups with chronic use.

d. Gastrointestinal System
Gastrointestinal side-effects are often encountered with Khat use, constipation being the most common gastrointestinal symptom caused by the tannins and alkaloid components of Khat. Stomatitis, esophagitis and gastritis and periodontal disease believed to be the result of the presence of strongly astringent tannins are noted in chronic users. Gastritis is common among users of Khat, and responds readily to antacids. In the few instances in which X-ray films were
available, it was evident that gastric ulceration was more frequent than in the duodenum. An antispasmodic action of Khat on the fundus and pylorus could account for the higher incidence of gastritis and gastric ulcers, but this requires documentation. Some patients with X-ray-proven ulcers reported that Khat decreased ulcer pain. In addition, the frequent intake of fluids probably provided some relief. Despite the active ingredients in the leaves, the chewing and the resultant secretion of saliva may decrease the acidity of the gastric contents.

Though gastritis and constipation are some of the main complaints of Khat users, loss of appetite is also a characteristic of its use. If malnutrition is present, the localized inflammations mentioned earlier can be aggravated. The tannic acids are also thought to be hepatotoxic. Anorexia and insomnia follow Khat chewing. Kennedy et al (1983) concur with WHO's nutritional assessment, finding hepatic, gastric, and urinary-tract problems to be far more common among women Khat-chewers than among men because women have inferior diets. However, after examining 355 women and 371 men, these researchers opine that the adverse health effects of Khat are less than the WHO contends.

Constipation which is frequent in both North and South Yemen is often accompanied by hemorrhoids. Al-Hardani, in a 2000 study revealed a significant association between the habit of Khat chewing and the development of haemorrhoidal disease. The combined effects of Khat on the brain and the gastrointestinal system result in anorexia which when prolonged leads to malnutrition, immune deficiency and increased susceptibility to infectious diseases such as hepatitis, tuberculosis and HIV.

e. Reproductive System
The epidemiological data derived from 1118 deliveries in Yemen show that at birth the mean weight of full-term single infants born to mothers who chew Khat habitually or occasionally, was below average (p-value<0.05). A study on pregnancy outcome showed significantly increased incidence of infants with low birth weight (LBW) born to women who chewed Khat during pregnancy in comparison to those who did not. Kuczowski (2004) reported the case of a pregnant patient who developed chest pain, tachycardia, and hypertension following Khat-chewing. Chewing of the leaves of the Khat plant (Catha edulis Celestrasae) is a habit that is widespread among women, even during pregnancy.

ENVIRONMENTAL HEALTH
Chewing Khat leaves, Cathula edulis, is now very common among the people of the mountainous areas of Yemen. For the past 20 years, in tandem with national development, Khat chewing has rapidly expanded, and the use of chemical pesticides in Khat production has increased. A recent study, reported the adverse effects of the use of pesticides and chewing of Khat. Results of interviews and questionnaires showed that those who chewed Khat grown with few or no chemical pesticides and those who used Khat grown with chemical pesticides have significantly different subjective symptoms. Those who used Khat produced in fields where chemical pesticides were used regularly had more symptoms than those who used what was produced in fields where chemical pesticides were rarely or never used. The former in particular, had acute adverse effects on the digestive system and chronic adverse effects such as body weakness and nasal problems. Farmers who chew Khat on which chemical pesticides have been sprayed may have the highest health risks as a result of the combination of Khat and pesticides.

People who chewed Khat were studied within a sampled population in Uganda. The relationship between tobacco smoking, drinking alcoholic beverages and the Khat chewing habit was established. Out of 181 respondents, 164(90.6%) had heard of Khat, 126(69.6%) had seen it and 57(31.5%) had chewed Khat before. As at the time of this study, 37(20.4%) still chewed Khat. Within the three categories of subjects, ironically the use of Khat was highest among law enforcement officials (97.1%), followed by drivers (68.8%) and students (9.2%). This problem needs to be addressed because of the public health implications.

A report on the instructors of an Ethiopian college stated that 76 (42.0%) were either lifetime smokers or lifetime Khat chewers or both. The current prevalence rates of cigarette smoking and Khat chewing were found to be 13.3% and 21.0%, respectively. The majority of the instructors started smoking (56.8%) and Khat chewing (40.0%) while they were senior high school or first year college students. Most of the instructors (82.1%) knew that cigarette smoking was a risk factor for lung disease including lung cancer. The prevalence of cigarette smoking seemed to have
decreased among university instructors, but the prevalence of Khat chewing remains almost the same. Instructors were aware of the common health risks associated with cigarette smoking. Those responsible for high schools and colleges should make an effort to inform their students about the health and socioeconomic problems associated with cigarette smoking and Khat chewing. College students also need counseling on ways of coping with their problems.

CONCLUSION AND RECOMMENDATIONS

The habit of chewing Khat leaves (Catha edulis) is widespread in certain areas of East Africa and the Arabian Peninsula such as Jazan region. There are concerns about health hazards related to the consumption of Khat.

Some studies have shown that Khat contains chemicals which are active brain stimulant. It has pleasurable central stimulant properties, which are commonly believed to improve the capacity for work and counteract fatigue. Traditionally, this has been a positive role. Excessive patterns of use put pressure on the community. The following recommendations for reducing Khat hazards are made:

- Work to improve the situation of the above mentioned communities and give advise on health promotion during Khat chewing sessions.
- Increase public awareness of the potential health hazards of Khat chewing;
- Support scientific research on Khat in different institutions and universities and explore the different effects of Khat on public health.
- Integrate education on Khat into the curricula of the primary and secondary schools.

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