

Khat, driver impairment and road traffic injuries: a view from Ethiopia

William Eckersley,^a Ruth Salmon^b & Mulugeta Gebru^a

Introduction

Globally, road crashes are the ninth single biggest cause of death, killing 1.2 million people annually. The World Health Organization estimates that this could rise to 2.4 million by 2020, with 85% of this increase being in low- and middle-income countries. Road traffic crashes cost developing countries a staggering 1–2% of their gross domestic product.¹ However, relative to the burden of disease, road safety research receives little funding – especially in low- and middle-income countries.

While driver impairment is recognized as a significant global cause of road crashes, research into impairment has focused on issues of concern to high-income countries. Issues of primary concern to low-income countries have been neglected. One of these is the stimulant effect of the leaf *khat* (*Catha edulis*, also spelled *qat* or *kat*), commonly chewed by drivers in Ethiopia and other countries in eastern Africa and the Arabian peninsula. While there is sufficient evidence that *khat* may be a major contributor to road traffic crashes in this part of the world, its effects are still poorly understood. More research is urgently needed to inform policy in the countries where it is chewed.

Road safety in Ethiopia

Ethiopia has some of the most dangerous roads in the world and has pursued an ambitious road expansion policy in the past 10 years. The Ethiopian National Road Safety Coordination Office cites a road crash fatality rate of 114 deaths per 10 000 vehicles per year but the real figure may be higher due to underreporting. This compares to a road fatality rate of one death per 10 000 vehicles per year in the United Kingdom of Great Britain and Northern Ireland and an average fatality rate

of 60 per 10 000 vehicles across 39 sub-Saharan African countries.²

Officially, 81% of crashes in Ethiopia are attributed to driver error.³ Driver impairment is rarely recorded as a contributory factor and the traffic police have virtually no equipment to measure alcohol or drug use. In spite of this, police and government officials told us that they believe *khat* use is a major cause of driver error and crashes. The general public also identifies *khat* use by drivers as a danger. Most people avoid travelling at night, primarily because this is when truck drivers are likely to be tired and/or driving under the influence of *khat*. These drivers are regarded as so dangerous that their trucks are commonly referred to across Ethiopia as “*al Qaeda*”.

A natural amphetamine

Khat is cultivated predominantly in eastern Africa and is consumed by an estimated 20 million people every day on the Arabian peninsula and in eastern Africa. For centuries *khat* has been integral to social life in these areas and it is common for the streets to empty in the early afternoon as people retire to chew the leaf – a practice typically lasting several hours.

The principal constituents responsible for the stimulant effects of *khat* are widely thought to be the alkaloids cathinone and cathine, which are structurally related to amphetamine. The subjective effects of *khat* are reasonably well understood; it initially leads to euphoria, feelings of alertness and excitability, typically followed by irritability and insomnia and, later, lethargy.⁴

In Ethiopia the consumption of *khat* is legal and its production earns valuable income for many farmers. While it is generally associated with the predominantly Muslim eastern region of Ethiopia, *khat* is increasingly chewed by highlanders in the central

plateau and north, particularly by those using it to stay awake for long periods including students and commercial drivers. However, its growing use is widely condemned by the Ethiopian Orthodox church. Other commentators have blamed the consumption of *khat* for social problems such as mental illness and marriage breakdown.

Khat and driver impairment

In interviews and discussions about road safety with drivers, pedestrians, traffic police officers and transport policy-makers, we found that *khat* use was consistently raised as an important contributor to Ethiopia's high crash rates. We were consistently told that it increased driver confidence and vehicle speed while also making drivers irritable and impairing concentration. Traffic police officers regarded the practice of relying on *khat* to stay awake as especially dangerous because it leads to a misplaced sense of alertness. One officer told us that high levels of *khat* consumption cause hallucinations that can lead drivers to swerve to avoid imaginary objects.

We know of only one study that seeks to understand the relationship between chewing *khat* and driver impairment. The study researched cathinone and cathine levels in the blood and urine of 19 African/Middle Eastern *khat* users who had been stopped by the police in Germany, on suspicion of driving under the influence of drugs. As the majority of these individuals exhibited marked impairment of psychophysical functions, the authors concluded that chewing *khat* may severely impair driving ability. Notably, however, the authors did not find a clear correlation between alkaloid levels and impaired driving and suggested that levels of habituation and withdrawal symptoms are important factors that

^a Jerusalem Children and Community Development Organisation, Addis Ababa, Ethiopia.

^b Steer Davies Gleave, 28–32 Upper Ground, London, SE1 9PD, England.

Correspondence to Ruth Salmon (e-mail: ruth.salmon@sdgworld.net).

(Submitted: 21 May 2009 – Revised version received: 31 August 2009 – Accepted: 1 September 2009 – Published online: 21 January 2010)

may also govern *khat*'s influence on driver impairment.⁵

Driving while chewing, or having recently chewed, *khat* is implicitly outlawed in Ethiopia under a federal law banning "driving under the influence of mind-affecting drugs". However, many of the traffic police officers we interviewed were not aware of this law. Further, there is no readily available technology that tests for *khat* consumption. A simple method is to ask a driver to stick out his/her tongue and check if it is stained green. However, this test does not provide an accurate guide of the quantity of *khat* consumed and the drug's effects are likely to outlast such staining.

The global context

In considering appropriate responses to *khat* consumption, lessons can be drawn from international experience of dealing with driving under the influence of other drugs. There is growing awareness of the influence of a range of medicinal and recreational drugs – both legal and illegal – on road safety.⁶

As it is legally available and integral to social life for many people, *khat* use in Ethiopia is comparable to alcohol use in many high-income countries. However, unlike *khat*, the impairment effects of alcohol on driving are well understood. This has provided evidence on which countries have built extensive

regulatory frameworks and responses, such as public education campaigns, permitted driver blood-alcohol concentrations and testing technologies. Similar responses might prove to be appropriate for *khat*. However, as with alcohol, responses must be based on thorough understanding of the effects of *khat* on driver impairment, an appreciation of the social context of its use and consideration of the practicality of regulation. Currently, this evidence is not available for *khat*.

Road safety research

Globally, relative to the scale of the health problems caused by road crashes, there has been insufficient investment in research and interventions to reduce road traffic injury. Existing research has been skewed towards issues that concern high-income countries, such as alcohol and, more recently, the use of mobile phones while driving. We suggest that *khat*-related impairment could be an overlooked contributor to the extraordinarily high traffic crash and fatality rates in Ethiopia and other countries in eastern Africa.

What is now needed is empirical research that identifies the impairment effects of *khat* grounded in social understanding of how *khat* is used. We propose two research questions: (i) What is the relationship between the consumption of *khat* and driver impairment? In

particular, is it safe for a driver to chew a small amount of *khat*? And if so, what is a "safe" amount? (ii) Given that *khat* is often used by drivers to help them stay awake, what are the effects of *khat* combined with fatigue?

We also propose three social research questions, which need to be answered to inform effective policy responses: (i) Which drivers chew *khat*? (ii) When, and under what circumstances, do they chew it? (iii) What beliefs do drivers have about the effects of *khat* on their driving ability?

Without further research, Ethiopian policy-makers will remain inadequately informed about the real impact of *khat* on drivers and will be unable to design meaningful legislation or effective road safety education campaigns. The public will remain unaware of the risks of chewing *khat* and driving, and will be unable to make informed decisions such as whether or not to board a bus if a driver is chewing *khat*. Road building continues apace in Ethiopia but the contribution of *khat* use to the country's poor road safety record is not yet understood. ■

Acknowledgements

We thank Mahateme Mikre and Daniel Hailu for their invaluable assistance with interviewing informants.

Competing interests: None declared.

References

1. *World report on road traffic injury prevention*. Geneva: World Health Organization; 2004 Available from: http://www.who.int/violence_injury_prevention/publications/road_traffic/world_report/en/index.html [accessed 20 January 2010].
2. *Global status report on road safety: time for action*. Geneva: World Health Organization; 2009 Available from: www.who.int/violence_injury_prevention/road_safety_status/2009 [accessed 20 January 2010].
3. *How safe are Ethiopian roads?* Addis Ababa: Ethiopian Roads Authority; 2005 Available from: <http://www.era.gov.et/roadsafety.htm> [accessed 20 January 2010].
4. Assessment of khat. Report of the: *34th expert committee on drug dependence*. Geneva: World Health Organization; 2006 (WHO 34th ECDD 2006/4.4). Available from: http://www.who.int/medicines/areas/quality_safety/4.4KhatCritReview.pdf [accessed 20 January 2010].
5. Toennes SW, Kauert GF. Driving under the influence of khat-alkaloid concentrations and observations in forensic cases. *Forensic Sci Int* 2004;140:85-90. PMID:15013169 doi:10.1016/j.forsciint.2003.11.028
6. *Drug use, impaired driving and traffic accidents*. Lisbon: European Monitoring Centre for Drugs and Drug Addiction; 2008. Available from: <http://www.emcdda.europa.eu/publications/insights/driving> [accessed 20 January 2010].