

**Driving Under the Influence of Khat; the Perspective of Ethiopians**

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# DRIVING UNDER THE INFLUENCE OF KHAT: FROM THE PERSPECTIVE OF ETHIOPIANS

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## Abstract

**Background:** In Ethiopia, chewing khat is legal and driving while chewing is normal. Although drugged driving is implicitly illegal in the country, it does not appear that this law includes khat. It has been suggested that the government's lax policy towards khat may be due to the fact that khat has become the major cash crop and foreign currency generator and from the assumption/ fear that taking any action against it may cause social uproar which will make it harder to implement policies that would be adhered by the public- the assumption being most people in Ethiopia are not concerned about the dangers of driving under the influence of khat. This survey, therefore, was conducted to investigate the awareness and magnitude of concern by Ethiopians about the dangers of driving under the influence of khat.

**Methodology:** A cross sectional study was conducted in Addis Ababa Ethiopia. A total of 406 participants were recruited using convenience sampling method. Data were collected through survey using close ended questionnaire. Univariate logistic regression methods was used to assess association between variables.

**Result:** 46% of respondents considered khat to be drug; 48% indicated that they would feel safe traveling with a driver who was chewing khat; however, 62% indicate that chewing khat while driving should be a punishable offense. There were no differences in responses by religion, means of transportation (private vs. public) or by whether people had children or not. There were differences based on gender and age. Over all, men were more likely to think that khat is not drug than women (OR =2.71 95%CI =1.82-4.06; p=0.0017). Younger men (18-31 years of age) were more likely to think that khat is drug than older people (OR = 1.96 95% CI = 1.25-3.04; p=.02). Men more than women and specifically young men (18-31) were more likely to feel safer riding with or traveling along someone driving while chewing khat (OR = 2.70 95%CI = 1.69-4.00; p = <.0001) and (OR=3.84 95%CI =2.44-5.9; p < .000) respectively. Women were more likely to think driving while chewing khat should be punishable comparing to men (OR= 1.60 95% CI= 1.08-2.4; p = .02). Those >31 (regardless of gender) were more likely to think driving while chewing khat should be punishable by law (OR=3.17 95%CI=2.06-5.00; p =.0001). There was no difference in responses by major category of occupation. But, noticeable difference was noted among people of other occupations and the sub group of taxi and long distance truck drivers. As such, taxi and truck drivers were found to be less likely to think khat is drug (OR=13.51 95%CI=1.72-17.19; p=0.014), and more likely to feel safer around other drivers who drive while chewing (OR=3.57 95% CI=1.21-10.00; p=.021) and more likely to think driving while chewing khat should not be punishable bylaw (OR=6.495% CI= 2.26-18.00; p=0.0005)

**Conclusion:** This survey has the limitation of being based on a convenience sample. However, it nonetheless allows us to draw several reasonable conclusions. Awareness of the dangers of driving under the influence of khat is strong among the general public but weak among the younger, especially men (18-31) and those who drive for living i.e. taxi and long-distance truck drivers. Therefore, government needs to design strategies that would increase awareness among these groups and enforce laws that would prohibit chewing and driving without fearing any negative repercussions.

## **Introduction**

Khat (pronounced “qat”) is a plant that contains Cathinone: a psycho active substance that causes central nervous system stimulation similar to the effects of amphetamines. (1) Khat is believed to be native to Ethiopia and is heavily consumed in East Africa and the Arabian Peninsula for its help with alleviating fatigue, staying alert, reducing hunger, and causing euphoria. (2)Traditionally khat consumption was confined to the Muslim community from the south-eastern part of the country, the province of Harar. But gradually, “the habit spread to the central highlands and to the western parts of the country and crossed over religious and ethnic boundaries.”[3] Today, khat is chewed by people of all ages, religions, gender and ethnicities. Students use it to help them with their concentration while studying, drivers and others who work long and arduous hours use it to stay awake and alert and others chew it for socialization and in religious rituals to give them the stamina to match their devotion”. [4]

Although whether the plant can be classified as psychoactive drug or not is still debatable by many, Cathinone, the main chemical found in khat leaf, is structurally similar to that of amphetamine (fig. 1). [5] According to the US Drug Enforcement Administration (DEA), khat “can induce manic behavior with grandiose delusions, paranoia, nightmares, hallucinations, and hyperactivity”. [6]

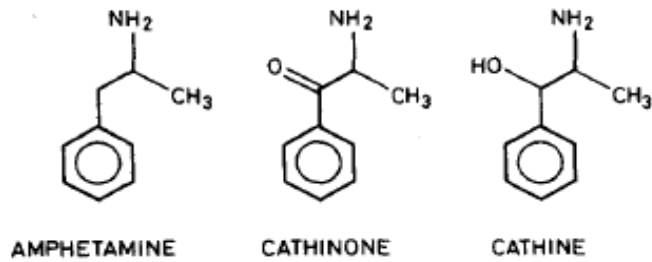


Fig. 1 Chemical structures of Cathinone and Cathine (found in khat and amphetamine)

In recent years, khat has been introduced to the outside world due to the influx of migration from the Eastern African region [7]. To date, khat is legal in Australia, Djibouti, Ethiopia, Kenya, Somalia, Uganda, Yemen, UK, and the Netherlands but remains to be illegal in the Arab countries, Europe, US and Canada. [8]

Previous studies have discovered that higher level of amphetamines in general increase risk-taking behavior and can develop inappropriate and dangerous driving manners. Thus, as an amphetamine, khat may have the tendency to do same. Colzato, Lorenza, et al (2010) have emphasized that chronic khat use is associated with “loss off inhibitory control” and attributed this insufficiency to “the possibility that, at long-term use, Cathinone, is associated to dysfunctions in PFC [pre-frontal cortex] and a reduced DA [dopamine] level in the striatum – the neurotransmitter that plays a crucial role in response inhibition.” [9] It has also been reported by druginfo.org, that it is “dangerous to drive after using khat as its effects such as disorientation and increased irritability and anxiety, can affect driving ability.”[10] Given that, it would not be hard to argue that khat contributes to the rising road side traffic accident rate in Ethiopia especially when considering the fact that “81% of crashes in Ethiopia are attributed to driver error.” [11] However, khat is still legal in the country and driving while chewing this dangerous drug is not yet a punishable offence. It is believed by many that the reason the Ethiopian

government is lax about this problem is because it thinks since khat is deeply integrated into the social fabric taking any action against the substance (including prohibiting driving under its influence), may trigger social uproar.[12] The notion that government does not want to ban khat because in recent years the leaf has become the “preferred and most sought-after cash crop, and an important income-generating occupation for millions of Ethiopians in the domestic market” [13] and major foreign currency earner to the country- second after coffee[14]is also another reason taken by many as a contributing factor to the high prevalence of khat consumption in the country. In other words, the Ethiopian government’s passive attitude towards prohibiting driving while high on khat may come from the concern that regulating it will have an negative economic and political ramification and from the assumption that policies and laws may not even be effectively adhered since the public is not concerned about the danger of driving under the influence of the substance. This study, therefore, was conducted to investigate how the Ethiopian public feels about the dangers of driving while high on khat. The goal of this study is to provide policy makers with reliable data so effective policies can be drafted. Since road traffic accidents (RTAs) have become public safety and development hindrances, resulting “in an estimated 1.2 million deaths and 50 million injuries worldwide each year” [15] and, in fact, RTA is projected to become the world's third leading cause of premature death by 2020” [16] and Ethiopia is among the countries with RTA related higher morbidity and mortality rate (currently ranked 12<sup>th</sup> in the world by the WHO) [17-18], it is hoped that this study will contribute to the reduction of road side accident mortalities and morbidities and thus to the improvement of public health in Ethiopia in general.

## **Methodology**

A cross sectional study was conducted from 12/17/13- 1/26/14, in Addis Ababa, Ethiopia. In planning for the study, we calculated a desired sample size based on comparisons for two groups. These comparisons would involve comparing the proportion of people answering yes to the main questions posed (e.g. do you think khat is a drug) for two different groups (e.g. gender, age (younger vs. older), employed, etc.). Assuming a proportion answering yes for each main question of 0.4 in one group, we needed at least 348 respondents in total to be able to detect a difference of 0.55 or higher (OR of 1.83 or higher), at  $p < 0.05$  significance and 80% power in comparison to the other group. Hence, the eventual sample size of 406 was satisfactory.

<b>Variables</b>	<b>Men (n %)</b>	<b>Women (n %)</b>	<b>Total (n %)</b>
<b><u>Age</u></b>			
18-31	66 (33.3%)	66 (31.7%)	132 (32.4%)
31-40	49 (24.7%)	55 (26.4%)	104 (26.0%)
41-50	53 (26.8%)	47 (22.6%)	100 (24.6%)
>50	30 (15.2%)	40 (19.2%)	70 (17.0 %)
<b><u>Occupation</u></b>			
Student	22 (11.1%)	36 (17.3%)	58 (14.3%)
Employed	83 (41.9%)	62 (29.8%)	145 (35.7%)
Unemployed	93 (47.0%)	110 (52.9%)	203 (50.0%)
<b><u>Religion</u></b>			
Muslim	74 (37.4%)	96 (46.2%)	170 (42.0%)
Christian	116 (58.6%)	107 (21.4%)	223 (55.0%)
Other	8 (4.0%)	5 (2.4%)	13 (3.0%)
<b><u>Children</u></b>			
Have children	98 (49.5%)	84 (40.4%)	182 (44.8%)
Have no children	100 (50.5%)	124 (59.6%)	224 (55.2%)
<b><u>Transportation</u></b>			
Private car	36 (18.2%)	27 (13.0%)	63 (15.6%)
Public Trans.	162 (81.8%)	181 (84.0%)	343 (84.4%)

### **Data collection, processing and analysis**

Data were collected through a questionnaire that was translated from English into Amharic (the national language of Ethiopia) and was back translated by a professional translator for accuracy. Participants were asked whether they thought khat was drug or not, whether they would feel safer traveling along or riding with someone who was chewing while driving, and whether they thought driving while chewing khat should be a punishable offence or not. Subjects were approached at various university campuses in the city, taxi stands, and truck hubs and through door to door interviews. Data analysis was done using Epi-info7. Since the questions were dictums -i.e. required yes and no answers, logistic regression method was used to assess association between variables.

### **Ethical consideration.**

Ethical clearance was obtained from the University of Washington Institutional Review Board (IRB). No personal identifiers (i.e. names) were used and neither were subjects asked for their khat use. Participation was strictly on a volunteer basis and no monetary compensation was made. Responders were informed they could stop taking the survey at any time if they chose to do so.

### **Result**

A total of 406 participants 198 (49%) men and 208 (51%) women were recruited using convenience sampling method. Subjects were then stratified by age (32% between the ages of 18-30, 26% 31-40, 25% 41-50 and 17% >50), by occupation (14% students, 36% employed and 50% unemployed), by religion (42% Muslim, 55% Christian, 3% other), whether they have children or not (45. % did children 55. % did not have children) and whether they use private or public transportation (15.5% used private and 84.5% used public transportation. (Table 1).

The overall responses to each of the three main study questions were:

- Do you think khat is drug or not?
  - 46% yes.
- Do you feel safe traveling with or driving along someone who is chewing while driving?
  - 48% yes.
- Do you think chewing khat while driving should be a punishable offense?
  - 62% yes

No significant difference was observed among those with children vs. no children; by religion; by means of transportation; or main category of occupation. There were differences in answers to the questions based on gender and age. Over all, men were more likely to think that khat is not drug than women (OR = 2.71 95%CI= 1.82-4.06; p = .0017). Furthermore, among men, younger men (18-31 years of age) were more likely to think that khat is drug than older people (OR = 1.96 95% CI= 1.25-3.04; p = .02). Men in general more than women and specifically young men (18-31) were more likely to feel safer riding with or traveling along someone driving while chewing khat (OR= 2.70, 95%CI= 1.69-4.00; p= <.0001) and (OR = 3.84, 95%CI = 2.44-5.9; p < .0000) respectively. Women were also found to be more likely to think driving while chewing khat should be punishable comparing to men (OR=1.60,95%CI=1.08-2.4;p=.02). Those over the age of 31 (regardless of gender) were also more likely to think driving while chewing khat should be punishable by law (OR = 3.17, 95%CI=2.06-5.00; p = .0001).

**Table 2: Percentage of yes or no responses given by strata.**

<b>GENDER</b>	<b>QUESTION 1<sup>1</sup>.</b>		<b>QUESTION 2<sup>2</sup></b>		<b>QUESTION 3<sup>3</sup></b>	
	<b>NO</b>	<b>YES</b>	<b>NO</b>	<b>YES</b>	<b>NO</b>	<b>YES</b>
<b>MEN</b>	66	34	39	61	44	56
<b>WOMEN</b>	42	58	64	36	33	67

<sup>1</sup> Do you think khat is drug or not?

<sup>2</sup> Do you feel safe traveling with or driving along someone who is chewing while driving?

<sup>3</sup> Do you think chewing khat while driving should be a punishable offense?

<b>AGE</b>						
18-30	64	36	30	70	57	43
31-40	53	47	54	46	33	67
41-50	55	45	62	38	32	68
≥50	33	67	74	26	20	80
<b>OCCUPATION</b>						
STUDENTS	64	36	29	71	52	48
EMPLOYED	60	40	50	50	40	60
UNEMPLOYED	61	39	59	41	34	66
<b>RELIGION</b>						
MUSLIM	50	50	53	47	42	58
CHRISTIAN	56	44	51	49	35	65
OTHER	61	39	46	54	38	62
<b>CHILDREN</b>						
HAVE CHILD	56	44	54	46	35	65
HAVE NO CH.	52	48	50	50	40	60
<b>TRANS</b>						
PRIVATE	60	40	59	41	37	63
PUBLIC	53	47	50	50	39	61

**Table 3: Logistic regression model estimate of people's response to whether khat is drug or not. Addis Ababa, Ethiopia, 2013-2014.**

Explanatory variable	YES	NO	OR (95%CI)	P-value
<b>GENDER</b>			2.71 (1.82- 4.06)	.017
Men	67	131		131
Women	121	87		
<b>AGE</b>			1.92 (1.25-2.95) *	.003
18-30	47	85		
31-40	49	55		
41-50	45	55		
>50	47	23		

\*for age 18 – 30 years vs. all other ages combined.

**Table 4: Logistic regression model estimate of safe driving along side or riding with someone chewing khat while driving. Addis Ababa, Ethiopia, 2013-2014.**

Explanatory variable	YES	NO	OR (95%CI)	P-value
<b>GENDER</b>			2.7 (1.81-4.00)	.019
Men	132	78		
Women	120	76		
<b>AGE</b>			3.84 (2.44-5.90)*	<.0001
18-30	92	40		

31-40	48	56
41-50	38	62
>50	52	18

\*for age 18 – 30 years vs. all other ages combined.

**Table 5: Logistic regression model estimate of people’s response to whether chewing khat while driving should be punishable by law. Addis Ababa, Ethiopia, 2013-2014.**

Explanatory variable	YES	NO	OR (95%CI)	P-value
<b>Gender</b>				1.60( 1.08-2.40)
.02				
Men	111	87		
Women	139	69		
<b>Age</b>				3.17 (2.06-5.00)*
.0001	18-30	57	75	
31-50	69	34		
41-50	68	32		
>50	56	14		

\*for age 18 – 30 years vs. all other ages combined.

**Table 6: Response by taxi and long-distance truck drivers to each question.**

	YES	NO	OR (95%CI)	P-value
Q1		10	26	13.51 (1.72-17.90)
.014				
Q2		20	9	3.57 (1.21-10.00)
.021				
Q3		10	19	6.40 (2.26-18.00)
.0005				

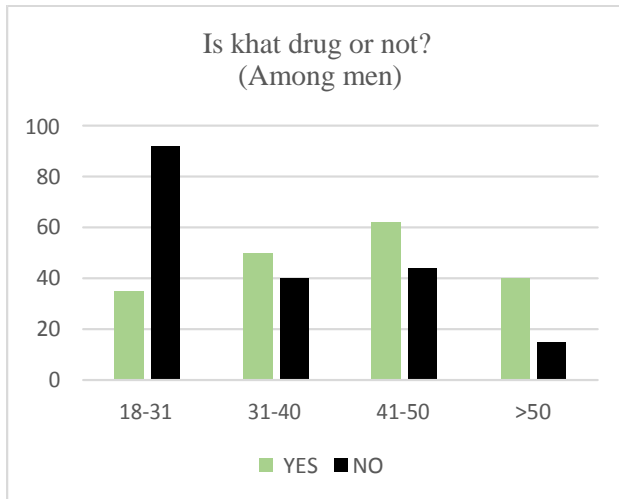


Fig.4

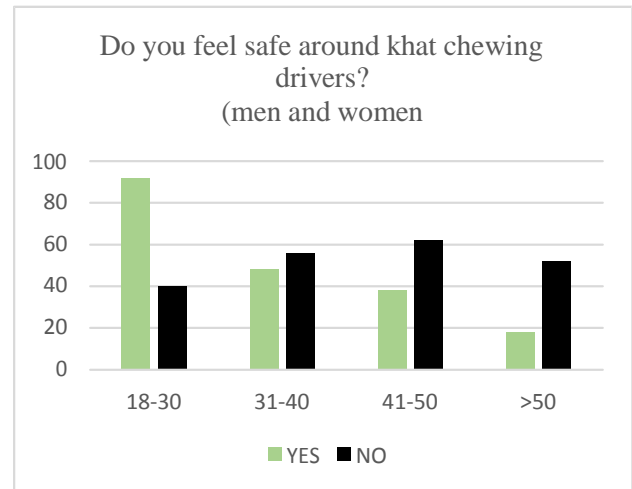


Fig.3

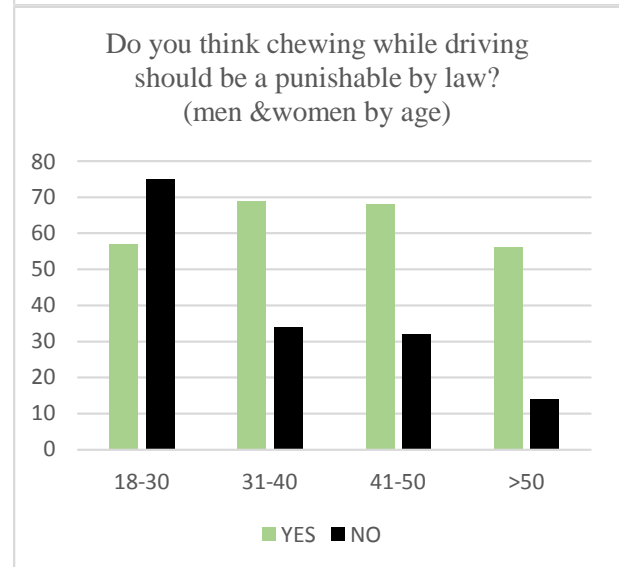
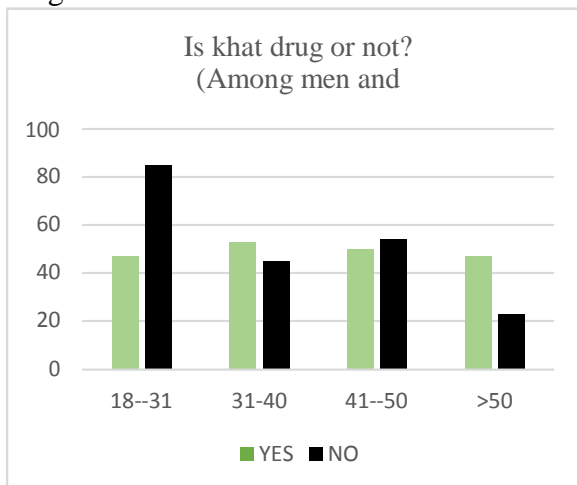
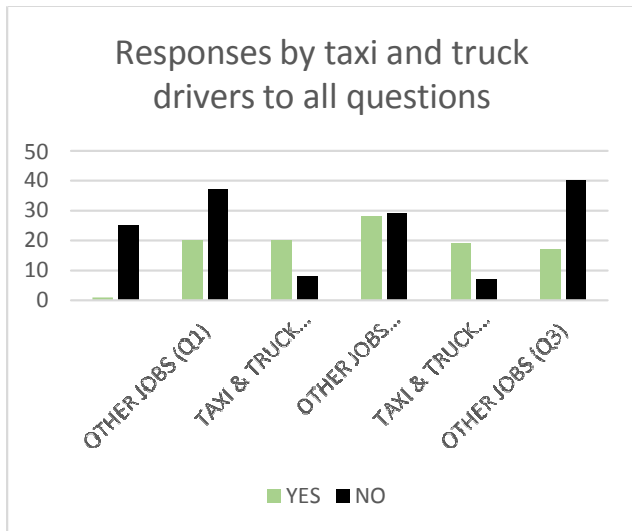


Fig.5

As noted above, there was no difference in response to the questions by main occupation category (student vs. employed vs. unemployed). However, noticeable differences were noted among people of other occupations and the sub group of taxi and long distance truck drivers. As such, taxi and truck drivers were found to be less likely to think khat is drug (OR=13.51 95%CI=1.72-17.19; p= .014), more likely to feel safer around other drivers who chew khat while driving (OR= 3.57 95%CI = 1.21-10.00 p= .021); and more likely to think chewing khat while driving should not be a punishable by act. (OR = 6.4 95%CI= 2.26-18.00; p = .0005)

Fig.6



## Discussion

This study has revealed two key points. One, the assumption that majority of people in Ethiopia are not aware and concerned by the dangers of driving under the influence khat thus any policy that would prohibit driving under the influence may not be effectively adhered does not seem to lend a strong support to the argument. Two, khat is no longer confined to being consumed by a community affiliated with a certain religion, age and gender.

As shown, the percentage of people who thought khat was drug and driving under its influence should be a punishable offence has increased as age increased and safety in relation to chewing khat and driving has decreased as age increased (figures 2-4). This supports the claim made by the previous researches that found the prevalence of khat use among the youth to be rising. [19] It is also consistent with that of Eckersley et al (2010) study that concluded “the general public also identifies khat use by drivers as a danger”. [20] This is a noteworthy finding for two main reasons. One, the under30 population is estimated to be only around 30% [21] – meaning a majority of the 70% over the age of 30 are aware of the danger. Two, it has isolated

the part of the society that appears to be less informed or even in denial about the danger khat poses thus will help policy makers to design interventions that would target this specific age group and taxi and truck drivers. The second finding, the fact that religion and occupation did not show significant difference is also another important point that needs to be emphasized. Historically, khat was frequented by Muslims in eastern Ethiopia, mainly in the province of Harar, as a means of socialization. However, as the results indicate, khat consumption has transcended religious, age and gender boundaries as shown by the similarities in reaction to the questions across the religions (Muslim, Christian, other) and men and women of age groups ranging between 31-40, 41-50, and >50. This is congruent with Gabissa's (2008) assertion that the "consumption has since spread to all regions of Ethiopia and all social groups, irrespective of religious affiliation, gender category, and age bracket." [22]

### **Limitation**

One major limitation of this study was that it was based on a convenience sample, as opposed to try random sampling. Hence, our ability to draw inferences about the attitudes of the population of Ethiopia in general as regards khat was limited. Likewise, information bias was anticipated to be a potential limitation in this study since people response could be shaped by their fear/desire to have seen khat banned. In other word, people who did not want to see khat banned may have downplayed the danger and those who wanted to see it outlawed may have exaggerated. It also needs to be noted that the fact the unemployed group was over represented may have affected the outcome since the youth unemployment rate in the country is high; officially estimated at more than 50% [23]. The confounding effect of alcohol is also one that needs to be taken into consideration because khat consumption is mostly accompanied by "chebsi" a supposedly

“climax breaking session of alcohol drinking.” [24] In other words, the observed erratic and dangerous driving could also be due to alcohol.

## **Conclusion**

As one of the least developed countries in the world, Ethiopia is perennially ranked among those with higher fatalities and injuries associated with road traffic accidents. According to the WHO, although, it has been disputed, in “2011, road traffic accidents deaths in Ethiopia has reached 22,786 or 2.77% of total deaths. The age adjusted death rate was 37.83 per 100,000 of population”. [25] But, there are reports that estimate it to be as high as 90/100,000 [26] or even higher. If the estimate holds true, Ethiopia may still very well be at the top of the list. If as Eckersley, et al said 81% of the total accidents is ascribed to driver errors, the role alcohol and drugs like khat play has to be taken into serious consideration. Furthermore, although khat’s popularity both domestically and outside of Ethiopia is growing and the fact that Ethiopia has become the world’s primary exporter of and of khat, which has given the government more reasons to encourage farmers to focus on growing khat, it needs to be noted that “ the bulk of it is marketed and consumed within the country”. [27] On the other hand, it must be understood that a growth in economy will lead to an increase in motorization- meaning more cars will be on the streets which will increase the likely hood of accidents to occur. The Ethiopian government should therefore take the general public’s awareness of the dangers of driving under the influence of khat and the lack of awareness among the younger generation, especially men (18-31) and those who drive for living (i.e. taxi and long-distance truck drivers) and design and strategies that would increase awareness among these groups and enforce laws that would prohibit chewing and driving without concerning for negative repercussions.

## **Acknowledgment.**

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