Published in final edited form as:

Alcohol. 2020 November ; 88: 73–81. doi:10.1016/j.alcohol.2020.04.005.

Alcohol stigma as it relates to drinking behaviors and perceptions of drink drivers: a mixed method study in Moshi, Tanzania

Deena El-Gabri, MScGH¹, Joao Ricardo Nickenig Vissoci, PhD^{1,2,3}, Brian J. Meier, MD, MScGH^{1,2}, Mark Mvungi, MD⁴, Michael Haglund, MD, PhD^{1,3}, Monica Swahn, PhD⁵, Blandina T. Mmbaga, MD, PhD^{1,4,6,7}, Charles J Gerardo, MD, MHS^{1,2}, Catherine A. Staton, MD, MScGH^{*,1,2,3}

¹Duke Global Health Institute, Duke University, Durham, NC USA

²Duke Emergency Medicine, Duke University Medical Center, Durham, NC USA

³Division of Global Neurosurgery and Neurology, Department of Neurosurgery, Duke University Medical Center, Durham, NC USA

⁴Kilimanjaro Christian Medical Centre, Moshi, Tanzania

⁵Georgia State University, Atlanta, GA USA

⁶Kilimanjaro Clinical Research Institute, Moshi, Tanzania

⁷Kilimanjaro Christian Medical University College, Moshi, Tanzania

Abstract

Background: Alcohol is a leading risk factor for road traffic injury in low- and middle-income countries, such as Tanzania. This research seeks to explore the drinking patterns, perceptions, and stigma of drink driving behavior of injury patients at Kilimanjaro Christian Medical Center in Moshi, Tanzania.

Methods: This mixed methods study incorporated the Perceived Alcohol Stigma (PAS), an additive Likert scale, and the Alcohol Use Disorders Identification Test (AUDIT). Results are reported as medians with IQRs. Additionally, focus groups with injury patients, their families, and community members (n = 104) were conducted and analyzed in pairs using an inductive thematic content analysis approach.

***Corresponding Author:** Catherine A. Staton, Duke Global Health Institute, Duke University, 2301 Erwin Road, DUMC Box 3096, Durham NC, USA 27710, catherine.staton@duke.edu, T: (919) 684-5537, F: (919) 681-8521.

Author Contributions

CAS, DE, MH, CJG, BTM, MS and MM contributed to the conceptual development of the project. DE, BJM, and CAS provided oversight of data collection. Local knowledge and presence were provided by MM, BTM, and BJM. Data analysis was conducted by JRVN, DE, BJM, CAS, MS and CJG. CAS, DE, BJM, and CJG were the primary contributors to writing the manuscript. All authors edited and approved the final manuscript.

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Conflict of Interest: The authors declare that there are no competing interests related to this manuscript.

Results: Those who self-reported driving after ingesting 3 or more alcoholic drinks had a median AUDIT score (median=11.0) significantly higher than those who denied drink driving (median=5.5, $p < 0.01$). The PAS showed a high overall stigma against those who use alcohol but differed for drink drivers, drinkers, and abstainers (median= 20.8, 23.9, 34.9, $p < 0.01$). Thematic content analysis highlighted a ‘disapproving of drink drivers,’ that ‘problematic drinking is a drinking behavior which negatively affects others,’ and a ‘passiveness toward drinking and drink driving.’

Conclusions: Stigma against those who use alcohol is present in Tanzania. Perceived stigma is significantly lower among those who drink drive than those who do not. Overall, there appears to be a community-wide disapproval of drinking and driving, which is coupled with feeling unable to change this risky behavior.

Keywords

Alcohol; Drink Driving; Stigma; Tanzania

Introduction

Both alcohol consumption and road traffic injuries (RTIs) are increasing in low- and middle-income countries {Rehm, 2009; World Health Organization, 2007; Dalal, 2013}. Drink driving drastically increases the likelihood of a crash and worsens the post-crash outcomes for the driver and for potential victims {World Health Organization, 2007}. Drink driving rates vary between and within countries, but in many countries, those who drink are likely to drink drive. The WHO reports that the groups at highest risk for drink driving are those who have previously been drink driving and those who drink four to five drinks per occasion {World Health Organization, 2007}. Additionally, at-risk groups are usually identified based on demographic characteristics and behavioral attributes, which vary substantially by country. Consequently, valuable information to reduce drink driving and RTIs attributable to alcohol consumption can be obtained by understanding the drinking and drink driving population and the associated decision-making process that leads to drink driving.

Current data on drink driving are sparse because few countries have the surveillance systems to monitor and report which traffic crashes involve alcohol or traffic crashes more generally. Literature on drinking patterns and excessive alcohol use show that certain social constructs may heavily influence alcohol-related behavior and perceptions of drinking. Societal-level factors are shown to predict alcohol use {Bloomfield, 2006, Alcohol and Alcoholism}. These influences range from personal encounters with alcohol to gender dynamics and societal roles, such as particular occupations, which may encourage heavy drinking, that may in turn dictate appropriate drinking behaviors within a society {Bloomfield, 2006, Alcohol and Alcoholism}.

In addition to societal perceptions, racial, ethnic, and cultural differences have been shown to influence an individual’s behavior as it relates to substance use {Wallace, 1999}. While these general patterns have been observed, social inequalities related to alcohol use differ across countries {Bloomfield, 2006, Alcohol and Alcoholism}. In order to understand alcohol use and misuse, it is necessary to gain a more nuanced understanding of the societal

perceptions, social relationships, and any stigma surrounding alcohol in a particular population. Perceptions of alcohol in Moshi, Tanzania, remain undescribed, and the impact of alcohol stigma on drinking behavior has not been previously studied in this environment.

In Moshi, Tanzania, where no drink driving interventions exist, it is valuable to target an intervention to at-risk individuals {Gentilello, 1999; Marlatt, 2002}. Injury patients comprise a particularly vulnerable population, as they have already suffered the repercussions of risky behavior and are at higher risk for further alcohol-associated behavior and consequences, specifically drink driving and RTIs {World Health Organization, 2010}. Due to this high risk among injury patients, they are an important target for future drink driving interventions. Specifically in Tanzania, since there isn't confounding by prior drink driving interventions, results from this population would highlight uncontaminated perceptions which would be generalizable to other low income settings. Additionally, due to the nature of alcohol interventions, utilizing various negotiation and reasoning techniques to trigger individual support for a change in behavior and understanding how a patient's drinking behavior fits into their society are imperative {Klimas, 2014; Ockene, 1999}. The success of an alcohol intervention rests on the input and support of the community.

In order to lay the framework for potential drink driving interventions, this study seeks to explore the drinking patterns, perceptions, and stigma of drink driving behavior in injury patients. Specifically, this mixed methods study seeks to: (a) describe drinking behavior and perceived alcohol use stigma associations with drink and driving behavior; and (b) explore the societal perceptions of drink driving in injury patients, family members and community members in order to identify the alcohol-related cultural norm and gaps for hospital-based interventions that would fit into this environment.

Materials and Methods

Ethical Statement

This study was approved by the Duke University Medical Center Institutional Review Board, Kilimanjaro Christian Medical University College (KCMUCo) Ethics Committee and the Tanzanian National Institute of Medical Research.

Study Population and Setting

This project took place in Moshi, a city in the Kilimanjaro region of Northern Tanzania with a population of 143,799. Moshi is home to KCMC, the third largest hospital in the country and the referral hospital for northwestern Tanzania {Staton, 2018}. Assessing the qualities and factors that lead to drink driving is important for this region, as road traffic crash rates are climbing and current data from the KCMC Emergency Department (ED) suggest that 28% of all patients who come to the ED for treatment of an injury consumed alcohol prior to their injury and therefore are "hazardous drinkers" {Staton, 2015, Research Portfolio Online Reporting Tools}. The Kilimanjaro region has previously been reported to have relatively high rates of alcohol consumption compared to other regions in Tanzania, with proposed factors including the influence of Chagga customs, work and tourist environment, and availability of home-brewed alcohol {Mitsunaga, 2008; Carlson, 1993; McCall, 1996}.

KCMC serves the urban and rural population of Moshi and was therefore selected as a central location to assess general perceptions related to drink driving in this region.

This study assessed the perception of drink driving and sought to understand the drinking behavior of those who drink and drive among the injury population. Injury patients were chosen as the population of interest because they have greater risk-taking behaviors and drink driving, thereby improving the sensitivity of the study {World Health Organization, 2007}. This strategy improved the sensitivity of the study, ensuring the detection of drinkers within the population at great risk for drink driving. Risky behavior and perceived stigma scales tested injury patients' relationship with drink driving. Concurrently, on a larger scale, focus groups among injury patients, their families, and community members described the community and social relationships with risky alcohol-related behaviours and perceptions of drinking and drink driving.

Study Design

This mixed method study examines the perceptions of drink driving within a high-risk population for which preliminary quantitative survey data informed qualitative focus group questions. Quantitative data were collected from surveys administered to injury patients who reported if they had previously drink driven or had not. The surveys assessed risky drinking behavior and perceptions of drinking, including stigma related to alcohol use, among these high-risk injury patients. Focus groups conducted among injury patients, their family members, and community advisory board (CAB) members helped explain the survey's results as well as overall perceptions on drink driving (Figure 1). R software was used to analyze survey data.

Quantitative Methodology

A quantitative analysis of drinking patterns as it relates to drink driving was assessed through the comparison of Perceived Alcohol Stigma (PAS{Glass, 2013}) Scale and the Alcohol Use Disorders Identification Test (AUDIT{Babor, 2001}). These scaled scores were used to examine drinking stigma and drinking behavior among the vulnerable injury population and the drinking perceptions, which influence drink driving.

Participant Selection

Patient enrollment, through convenience sampling, occurred during 70 hours per week during the data collection period. Patients arriving outside of those hours were checked for eligibility and included if eligible. Patients included in the study were seeking care at KCMC for an acute (<6 hours) injury, clinically sober at the time of enrollment, medically stable, able to communicate in Swahili, and able to provide full informed consent to participate. Patients were excluded from enrollment if they were medically unstable or had a deteriorating condition, too critically ill to participate, non-Swahili speakers, <18 years of age, presented for non-injury related complaints, were presenting 6+ hours after their injury, or did not consent to be enrolled. Subjects who were illiterate, or minimally literate, had the Swahili consent form verbally summarized by the study staff.

Variables

The administered survey collected the PAS Scale and the AUDIT scores. Additional demographic characteristics were collected.

The AUDIT is an instrument to assess problematic drinking {Babor, 2001}. The scale asks questions that evaluate alcohol dependence as well as hazardous and harmful alcohol use {Babor, 2001}. The AUDIT is a 10-item self-reported scale [range 0–40], and a score of 8 or above has a 85% sensitivity and 89% specificity, measuring harmful or at-risk drinking {Anderson, 2001, Alcoholism-Clinical and Experimental Research; Cherpitel, 1995}. The AUDIT has been standardized for six countries: Norway, Australia, Kenya, Bulgaria, Mexico, and the United States of America {Babor, 2001}. However, despite this cross-national standardization, scale developers maintain that the cut-off scores likely vary depending on a country's drinking patterns, alcohol content of drinks, and the environment in which the screening scale is utilized {Babor, 2001}. Despite this cutoff variation, the AUDIT yielded 0.76 and 0.79 as the lowest sensitivity and specificity, respectively, when assessed against the DSM-IV classification. These scores are higher in comparison to other largely cited alcohol behavior instruments {de Meneses-Gaya, 2009}. Based on the potential variability of appropriate AUDIT cutoffs, and the lack of validation of the AUDIT for the KCMC population, the total AUDIT score medians were reported to compare relative differences in risky behavior drinking.

The twelve-question Perceived Alcohol Stigma (PAS) Scale assesses an individual's perceived stigma toward those that drink alcohol {Glass, 2013}. Responses are measured with a six-point Likert scale ranging from “strongly agree” to “strongly disagree” {Glass, 2013}. PAS was assessed as a summative alcohol stigma score, producing an individual score which averaged to 6. An average score of 3 or greater has been cited to reflect high stigma toward a behavior {Ritsher, 2004; Ritsher, 2003; Link, 1991}. PAS has been used on high-risk drinkers as well as abstainers {Keyes, 2010}, and high PAS scores have been correlated with low mental health and a decreased likelihood of alcohol treatment for drinkers in high-income settings {Glass, 2013}. Therefore, this scale was used to assess the potential feasibility of alcohol interventions in high-risk groups. While in other cultures, the scale shows good psychometric properties {Ruan, 2008; Luoma, 2010}, the Tanzanian version showed some issues regarding the internal structure of the scale. Confirmatory factor analysis was used to adjust the internal structure of the scale. Five items of the original scale were excluded from analysis with poor factor loadings. The final model showed adequate fit indicators and overall good adjustment. Since we had to adjust the scale internal structure, we used factor scores for the analysis transformed to a scale of 0 to 100, where 0 represents low stigma and 100 represents high stigma.

Data Collection and Quantitative Analysis

Data were collected by two trained research nurses with over 10 years of experience with surveys on sensitive topics (e.g., alcohol, sexual history, HIV risk factors, social stigma). The nurses underwent a week-long training in medical ethics, background for tools, tool validation for language and comprehension, how to administer tools, and the overall project protocol. Survey answers were collected on paper forms, then checked for completeness and

errors when entered into a REDCap database. Secondary quality control was performed when the data set was reviewed after primary entry, then finally reviewed. Outliers were highlighted during data analysis. Data were analyzed using R data software. Descriptive statistics (frequencies and percentages), including whether a patient had previously drink drove, were compiled from the demographic and background information. Age was reported as a mean with standard deviations. AUDIT scores were compared between those who drink drive and those who do not. PPD scores were compared between those who drink drive and those who do not drink drive, and abstainers. IQR was assessed for each population group and the Wilcoxon rank sum test and Kruskal-Wallis were used to assess a significance difference with $\alpha < 0.05$.

Qualitative Methodology

A qualitative understanding of the drink driving behavior in Moshi was assessed through focus groups among three population representative groups. These focus groups were designed to understand community-wide perceptions of drink driving as well as reveal potential explanations for the quantitative drinking behavior and alcohol stigma scale differences in those who do and do not drink drive.

The semi-structured focus group was designed based on grounded theory and assessed using content analysis. Grounded theory allows for the further understanding of a research question for which cultural understandings do not warrant a complete and formal hypothesis {Corbin, 1990}. Grounded theory led to focus group questions about community drinking behavior and what is appropriate and acceptable behavior when deciding to or seeing someone drink and drive. Focus groups were conducted between August 2016 and January 2017.

Research Team and Reflexivity

Focus groups were conducted by two trained female research nurses at KCMC. The research nurses both have over ten years of experience conducting focus groups among similar patient populations. Focus group participants were informed of the aims of the study as well as the qualifications of the research team and focus group facilitators. They were informed that the focus group is a component of a greater research collaboration aimed at reducing alcohol-related injury in northern Tanzania. Facilitators reported their interest in the research as based in an investment in the livelihood and betterment of the community.

Participant Selection

Focus group participants were a convenience sample of injury patients, their families, and CAB members. Patients and their family members were identified in the KCMC ED waiting or treatment areas after treatment or stabilization, and were offered participation in the focus group. If patients or family members accepted, they were invited to return to the hospital for patient and family focus group days, respectively.

The focus groups occurred in a small, quiet room near the ED where patients or family members could freely discuss their thoughts and opinions. No members of the treatment

team were in the room, and patients' focus groups were separate from their family members' focus groups so everyone could talk more freely about their thoughts on drink driving.

Research nurse facilitators attended CAB meetings to conduct focus groups in order to utilize this group's perspective on drinking behavior within the community. The CAB members present at the monthly meeting were the participants in the focus group. The KCMC CAB is comprised of 30–40 adult community activists who understand research and have advised investigators on pertinent research questions, cultural norms, and cultural acceptability of interventions, treatments and research protocols.

Recruitment Criteria

Patients recruited for the quantitative portions of this study who were interested were recruited for focus group portion of the study. Family member focus group participants were family members of a patient who was enrolled in the study, who also agreed to participate, and spoke English or Swahili. For CAB member focus groups, all interested participants were enrolled who were 18 years of age and present at the CAB meeting when we conducted the focus group discussion.

Focus Group Procedures

For the patient and family member focus groups, once 5–10 eligible interested participants were recruited in the ED, focus groups were scheduled in a quiet room close to the ED. Focus groups lasted 45–60 minutes. Participants took part in an informed consent process approved by the Duke and Tanzanian ethics committees before joining the focus group. Focus groups were audiotaped and transcribed for formal qualitative analysis utilizing thematic analyses. Transcriptions occurred within days following the focus group, and research nurse notes were included in the transcriptions about the content.

CAB focus groups took place prior to the monthly CAB meeting and consisted of 5–10 members, who took part in an informed consent process. Focus group procedures were the same as those for patients and family members.

Focus groups among each population group (patients, families, and CAB members) were conducted using an iterative process until thematic saturation was reached. Due to the mixed method approach of the study, original focus group questions were designed to understand the general perceptions of drink driving in Moshi, Tanzania. These questions included “What is acceptable drinking behavior?” and “What is thought of a person who drinks and drives?” These scripted questions were piloted by the research nurses conducting the focus groups. After thematic saturation was reached, the focus group script was altered to expose reasons for preliminary data from patient surveys. Focus groups were conducted until thematic saturation was again reached.

After the focus groups were recorded and transcribed, each script was translated from Swahili to English. English scripts were then back translated and annotated for accurate comprehension. All transcripts, audio tapes, and related data will be kept for six years after study completion.

Qualitative Data Analysis

Analysis was iterative throughout the study, which allowed emerging themes to be explored in later focus groups. The focus groups among patients, family members, and CAB members were coded separately and then analysed. Comparing and contrasting across and within these datasets highlighted emerging themes and divergence of perspectives {Kendall, 2009}. Thematic saturation occurred when no new themes developed from focus group analysis and marked the end of the qualitative study for individual population subsets.

All transcripts were coded by DE and BM, using a thematic narrative approach, reflecting the research questions and themes raised by the participants {Riessman, 1993}. The researchers (DE and BM) separately completed coding with primary and secondary level coding classifications. DE and BM then compared coding with advisors specializing in qualitative research. The Tanzanian research group reviewed the evolving thematic codes and resulting narratives and gave input based on their experience with the focus group populations and cultural knowledge {Malterud, 2001}. Representative quotes for each theme were then selected based on comparative analysis of DE and BM coding with input from research team members.

Results

Survey Results

In total, 341 injury patients were surveyed. Of those who completed the survey, 246 patients drink alcohol or were previously alcohol drinkers and were therefore included in our analysis of drinking behavior and drink driving. Basic demographics, background information related to injury, and drinking characteristics are presented in Table 1. Most participants were male (82%) with an average age of 36.3 (SD=13.9). Alcohol use was reported by 15% of the participants, while only 5% had a positive breathalyzer test. Only 8% of the participants were identified as the drivers for their MVCs. The majority of the participants reported not having a drinking and driving event (n=228, 67%), while only 5% reported to drink and drive (n=17) and 28% reported not drinking in the past year (N=95).

The AUDIT of drink drivers (n=17) had a significantly higher median value of 11.0 (7.0;19.0) compared to the median AUDIT score of non-drink drivers (n=228) at 5.5 (2.0;12.0) ($p<.01$). AUDIT was the only variable associated with higher odds of drunk driving behavior (Table 1). The median PAS of drink drivers was 20.8 (12.1;46.3) while the median PAS score of non-drink drivers was 23.9 (12.1;42.9) and the median PAS of non-drinkers was 34.9 (19.4;57.6), as seen in Table 1 ($p<0.001$).

Individual question analysis of PAS scores revealed a majority of participants responding the most extremely stigmatized response to each question of the PAS, as seen in Figure 2. The only statement which the majority of participants did not give a stigmatized response to was, "Most people feel that entering alcohol treatment is a sign of personal failure." This was the only statement about an individual's response to their own alcohol, as opposed to community perceptions of alcohol use.

Focus Group Results

A total of 14 focus groups were conducted (6 patient, 6 family member, 2 CAB) with a total of 104 participants (40 patients, 50 family members, 14 CAB members). In analyzing these 14 focus groups, common themes emerged across the three disparate population groups. Focus group discussions between all three population types highlighted major themes of 'disapproving of drink drivers,' 'problematic drinking is a drinking behavior which negatively affects others,' and a 'passiveness toward drinking and drink driving.'

'Disapproving of drink drivers' theme

A common theme during the focus groups was an overall disapproval of those who drink drive. The disapproval was targeted, specifically, at those who have negative consequences attributable to having drink driven, not the act of drink driving. This disapproval was shown in commentary about drink drivers' character and behavioral traits. Notably, all participants showed a particular judgement of boda boda motorcycle taxi drivers and their tendency to drink drive.

Statements about the personality of those who drink drive, including claiming that those that drink drive "*are not civilized*" or that the type of person who drink drives is "*very bad*." However, some of these negative comments reasoned the drink driving to be due to a flaw in character or ignorance. For example, a participant (in the 2nd CAB focus group, CAB,2) stated that a drink driver "*is a killer or he doesn't take care of himself or he might not know driving while drunk is dangerous to him and to the people he is driving*." A patient participant (Patient, 2) blamed a drink driver's actions on his sanity: "*I see him like a person who is not in his senses*."

Associated with this theme of individual drink drivers perceived traits being the reason for drink driving, there was a particular mention of boda boda drivers. It was explained that young people start drink driving if they become boda boda drivers. "*Alcohol availability to young adults is easy because you can find a parent buy a boda boda and give it to a child to work with it when a child is coming from school. Therefore when he drive boda boda he also drinking alcohol, therefore to get alcohol is very easy for this age*." The community of boda boda drivers is thought to breed drink driving behavior. A patient participant (Patient, 1) stated: "*I am able to say this. Even these who ride motorcycles, even them, they also help one another in contributing some money and helping one of them who might not have the money to buy alcohol. So when it comes to boda boda people, I do not think that there is stigma*." A boda boda driver (Patient, 4) stated that if someone's drink driving behavior is affecting their work, "*they sit them in a meeting and they are told if they cannot reduce their alcohol then the society will discriminate them or if his boda boda is belonging to someone else then we can return it back to the owner*."

'Drinking which negatively affects others defines problematic drinking' theme

Another major contributing theme during the perceptions of drink driving focus groups was a feeling that 'drinking is problematic only when it negatively affects others.' This was reflected when participants described all alcohol abusers as those who have suffered alcohol-attributable injury and could not physically or financially support family due to alcohol

abuse. Additionally, drink driving was depicted as a community-level problem by participants who believed that police were responsible for reducing drink driving, not individuals with relationships to drink drivers.

When participants were asked to reflect on drink driving within their community, whether it is a problem and what the problem looks like, drink driving was defined as problematic when the act affected family and the larger community. A person with a drinking problem was described by one family member participant (Family, 3): *“Those drinking alcohol excessively, after they have gone bankruptcy... They are the ones who cause car accidents, killing others with no intentions because they drink and drive. They cannot even maintain their own families.”* The effect drink driving has on the community was seen in the description of drink driving problems among bus drivers: *“I have travelled several times in buses where the driver is drunk but while I’m in those buses I say my prayers silently.”*

For many participants, if they were not passive toward drink driving, they stated that it was their responsibility to contact police about drink driving. For example, one patient participant (Patient, 2) said, *“Passengers should be very careful with a drunk driver. They should inform the traffic police immediately.”* Another participant from the CAB 2 focus group gave an example of a time they successfully informed the police of their bus driver who was drinking: *“When we came out of the bus I went to the back of the bus and run to the traffic police and asked him to come and check our driver who is drinking while driving. The driver was caught, we were given another driver who was in the bus.”*

Another participant highlighted that it may take convincing for police to believe that a driver had been drinking. For example, a participant (CAB, 2) stated: *“If three people from the same bus tells him that your driver is drunk and if he doesn’t believe now s/he will have to wait until when the bus gets in an accident then he will believe.”* Other times, police do not take action if they are unable to get a replacement bus driver: *“Sometimes it is difficult to get another driver who is not drunk. So what [my peer] said is what is supposed to be done but that is not what we are doing.”* A participant (CAB, 1) said that at times, when police are called on a drink driver, there is a lot of blame and the bus will get delayed but no action is taken on the bus driver: *“They will call a policeman to come and stop journey but they will just talk till the end of their journey most of the time people blame and talk if driver is drunk but no any action is taken.”*

‘Passiveness toward drinking and drink driving’ theme

The final prominent theme across the three focus group types was an inability to change the alcohol-related habits of those who drink and drive, or an acceptance of their behavior, to a certain extent. This belief that there is no way to change drink drivers’ habits was demonstrated when participants spoke of drink drivers’ inability to listen, their avoidance of drink drivers, and their inability to take action when others are drink driving. Additionally, there was reference to drink drivers possessing alcohol dependence.

Participants emphasized that if they were to discuss the harms of drink driving with people that drink drive they would not listen to their concerns. For example, a patient from the Patient, 2 focus group said that drink drivers *“do not listen to anyone or ask for any*

assistance.” Another participant (CAB 2) cited a time he tried to convince a drink driver not to drive and stated, “We tried to advise him but he said he can’t stop drinking until he dies.” Others from Family, 3 focus group had given up hope in trying to change drink driver behaviors, saying, “We leave him [to drink drive] because we know he will not understand”.

Other participants demonstrated their passive attitude toward drink driving with their description of merely observing the behavior of others choosing to drink drive. One woman (CAB 2) stated what she does if a bus driver is drink driving: *“For me even if I’m sure that the driver is drunk I will just remain in the bus but worried. I won’t have peace and happiness because anything can happen due to that drunkenness. I have travelled several times in buses where the driver is drunk but while I’m in those buses I say my prayers silently.”* Many other participants stated that if they see a boda boda driver, or motorcycle taxi driver, who is intoxicated, they will leave him to go find another boda boda, having observed the negative behavior, removing themselves from the problem.

Participants highlighted that they have accepted that they do not know what to do with someone who is choosing to drink drive. For example, a patient participant (Patient, 1) stated, *“I do not know what should be done in this case because it is very difficult for them to understand you that he should not drive a motorcycle because he must bring money to his boss and he should take care of that motorcycle. Because they are given contract that he may drive for a period of one year and he must bring a certain amount of money and he must take care of the motorcycle and doing the service for the motorcycle. So when you tell him why don’t just stop riding a motorcycle, he does not get it.”* Another participant (CAB, 2) spoke of a time he unsuccessfully tried a traditional practice to stop someone from drinking: *“I decided to call his family in Sumbawanga to ask advice about what can I do to stop him from drinking because when he drinks he drives and is out of his senses, he abuses his wife and children. The parents told me to look for pig milk, and when I get that milk I should do all I can to mix it in the alcohol and then give him to drink. When he drinks he will vomit and from that point he will stop drinking. Now I started looking for that milk but I couldn’t get any [...] He continued drinking.”*

Lastly, participants referred to drink drivers’ inability to be function without alcohol, and used this behavior as a rationale or an understanding for their choice to drink drive. For example, a participant (CAB 1) described the type of people he knows who drink drive: *“[They] work difficult jobs, it is the type of job which is more informal and in order to do these job they must drink something, like alcohol, which can make them active because it is the type of job which needs more energy to do [...] Like carrying the load, daladala [bus] conductors, daladala driver, boda boda driver, therefore it is the type of job which needs more energy though they get hope of their life and hope to continue living by drinking alcohol, therefore they are drinking alcohol.”* Another (CAB, 1 focus group) participant said that a taxi driver he knows needs alcohol to be productive. He *“cannot start working without drinking.”*

Discussion

This study examined the drinking patterns, perceptions, and stigma of drink driving behavior in injury patients in Moshi, Tanzania. The findings reveal that injury patients who self-reported drink driving have significantly higher AUDIT scores or risky drinking behaviors than those who do not. Additionally, there is a high perceived alcohol stigma in general, but it is significantly less in those who drink drive or those who drink compared to those who are non-drinkers. In the focus groups, the discussion surrounding drink driving primarily addressed the behavior of those who drink drive and how it affects the community rather than what leads to drink driving or what individual factors of drinking behavior influence drink driving. These results show that drink driving perceptions in Tanzania are rooted within a community-based perspective, in that drinking behavior and subsequent enforcement are evaluated by how they affect the community as a whole.

The population of injury patients who reported drink driving scored significantly higher on the AUDIT, a scale assessing hazardous drinking behavior, than those who did not report drink driving. The act of drink driving is a risky drinking behavior often associated with high-risk alcohol consumption. These results are not only consistent with trends observed in other alcohol-using populations, they also add a valuable contribution to what we know about the community that drink drives in the population {de Meneses-Gaya, 2009; World Health Organization, 2007}. These results show that in Tanzania, as has been shown in other regions, excluding sub-Saharan Africa, drink driving is particularly prevalent among risky drinkers {World Health Organization, 2007}. Additionally, this data reveals that the AUDIT score can be a predictive measure of drink driving behavior as demonstrated by the difference seen among those who do and do not drink drive. While the AUDIT is an assessment of risky drinking behavior, none of its questions specifically refer to drink driving behavior {Babor, 2001}. Other scale assessments have been shown to identify drink drivers using scales that assess other risky drinking behaviors, and the results of this AUDIT scale analysis in this Tanzanian population shows that such an extrapolation might also be possible in this setting {Stacy, 1994; Ozkan, 2006; Jewell, 2008}. This would suggest a benefit of using the AUDIT scale as an assessment for particularly at-risk injury patients and incorporating drink driving prevention in any drinking intervention program.

When assessing the perceptions of drinking among injury patients that drink and drive a median PAS value of 70.8 was observed among all injury patients, regardless of whether they drink drive, do not drink drive, or abstain from alcohol. Notably, this median PAS value also implies a level of overall stigma toward those who drink {Ritsher, 2004; Ritsher, 2003; Link, 1991}. Our study suggests that PAS differs between non-drinkers, non-drink drivers, and drink drivers, with drink drivers having the lowest PAS. We found an indirect association between risky alcohol use and the presence of perceived alcohol stigma. A previous study assessing PAS across various alcohol use disorder levels, within one environment, in contrast showed no significant PAS difference across groups {Glass, 2013}. Other studies have shown that disproportionately high perceived stigma among problem drinkers deters them from treatment utilization and is highly associated with low psychological function {Smith, 2010, Journal of Studies on Alcohol and Drugs}. While this association appears in our results, further research is necessary to understand a causative

pathway and to assess stigma among particular cultural and social groups and its impact on care seeking in Tanzania.

The analysis of stigma in this study showed that at the community level, problematic drinking is defined by drinking that causes negative consequences to one's community or family. Struggles with addiction, or an inability to control one's drinking, remained unaddressed when participants depicted drink drivers. Particularly, the drinking behaviors of boda boda motorcycle taxis were underscored as a substantial concern. In other countries, motorcycle drivers have been identified as a high-risk group and their alcohol use is a factor specifically associated with motor vehicle crashes {Tumwesigye, 2016}. Moreover, stigma that does not recognize addiction as a disease at the individual level may have detrimental effects for those dependent on alcohol in this society. All of those that drink drive had a significantly higher AUDIT score than those that did not, suggesting that these patients are hazardous drinkers who may abuse or be dependent on alcohol {Jewell, 2008}. Yet, those who suffer from alcoholism in a society that blames those who drink likely have a harder time seeking and receiving care for their addiction {World Health Organization, 2007; Jewell, 2008}. When focus groups among the three Tanzanian population groups discussed what should be done to minimize drink drivers in the population, participants put the responsibility of identifying drink drivers or referring drink driving to police rather than civilians or peers. This perspective may poorly affect the outcome of potential drink drivers, as their peers may not discourage or attempt to prevent them from drink driving, a technique that has been shown to affect one's choice to drink drive {MacLeod, 2015}. Drink driving interventions targeted at the high-risk injury population, as well as education on alcohol misuse and addiction across the population, may be the best approach to reduce drink driving behavior and associated risks in Tanzania.

Limitations

This study was limited by its use of a self-reported question classifying a participant as a drink driver or not. While participants may have been biased in their reporting, this bias most likely led to underreporting. Therefore, we suspect true reporting would show more extreme results than this study displayed. Additionally, this study was limited by the drink driver group sample size.

Conclusions

While negative perceptions are present in Tanzania against those who use alcohol, it may not impact the choice to drink and drive. Furthermore the stigma associated with alcohol use was not stronger in drinkers or abstainers. Overall, there appears to be a community-wide disapproval of drinking and driving coupled with feeling unable to change this risky behavior. This information about the community perceptions and behaviors surrounding drink driving provides support for future research to address the drink driving pattern in Tanzania and in the broader region, which experiences a similar burden of alcohol use and MVCs.

Acknowledgements:

We would like to acknowledge the hard work of the Kilimanjaro Christian Medical Center Emergency Department Research Team. Their dedication to improving the health of their patients is inspirational and unwavering. We would also like to thank Kaitlyn Friedman and Ashley Morgan for their editing and assistance with this manuscript.

Funding

This research was supported by the Fogarty International Center of the National Institutes of Health under Award Number K01TW010000 (PI, Staton). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

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Highlights

- In Tanzania, problematic drinking was defined as negatively impacting the community
- While stigma against alcohol use is strong, it does not discourage drink driving
- Family members felt an inability to change drink drivers' alcohol-related habits
- Stigma associated with alcohol use was not stronger in drinkers or abstainers

Figure 1:
Flow diagram of Mixed Method Approach

Figure 2: Proportion of patients responding to the Perceived Alcohol Stigma Scale

*red shows stigmatized answer choice

Table 1:**Injury Patient Demographic Information**

	Total (N=341)	Non-drinkers (n=95)	Drinkers		
			Drink drove (n=17)	Did not drink drive (n=228)	OR (95% CI)/ P- value
Age , Mean (SD)	36.3 (13.9)	33.0 (13.3)	33.6 (10.8)	38.0 (14.1)	0.97 (0.92;1.01)/ 0.249
Male , n (%)	277 (82)	75 (80)	17 (100)	184 (81)	2.95 (0.54;55.1)/ 0.309
Self-reported alcohol before injury , n (%)	51 (15)	1 (1)	4 (24)	46 (20)	-
Positive breathalyzer , n (%)	18 (5)	-	2 (12)	16 (7)	-
MVC cause primary injury , n (%)	27 (8)	7 (7)	2 (12)	18 (8)	1.08 (0.15;4.67)/ 0.929
AUDIT , Median (IQR)	3.0 (0.0;9.0)	-	11.0 (7.0;19.0)	5.5 (2.0;12.0)	1.08 (1.02;1.15)/ 0.004
Perceived stigma scale , Median (IQR)	26.6 (12.1;46.3)	34.9 (19.4;57.6)	20.8 (12.1;46.3)	23.9 (12.1;42.9)	1.01 (0.98;1.03)/ 0.629

* statistically significant difference at alpha= .05