

Perceptions of Drinking and Drink Driving: a Mixed Method Study Assessing Risky
Behavior Among Injury Patients and the Factors Influencing Drink Driving in Moshi,

Tanzania

by

Deena Hatem El-Gabri

Duke Global Health Institute
Duke University

Date: _____

Approved:

Catherine A. Staton, Supervisor

Joao Ricardo Vissoci

Charles J. Gerardo

Thesis submitted in partial fulfillment of
the requirements for the degree of
Master of Science in the Duke Global Health
Institute in the Graduate School
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ABSTRACT

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Abstract

Alcohol is a leading risk factor for injury. Road traffic injuries are a leading killer, but perceptions of drinking and drink driving in Tanzania are unclear. This research aims to define how perceptions of drinking influence risky driving behavior at Kilimanjaro Christian Medical Center in Moshi, Tanzania. This mixed methods study incorporated the Alcohol Adapted Perceived Discrimination-Devaluation scale (PDD) and the Alcohol Use Disorders Identification Test (AUDIT) among 96 injury patients regardless of their alcohol use prior to injury. Results were reported as medians and IQRs with Kurskal Wallis tests. Additionally, focus groups with injury patients, their families, and community members (n = 63) were conducted and analyzed in parallel using an inductive thematic content analysis approach. Of the 96 injury patients surveyed, 53 used alcohol and 17%(n=9) of those self-reported driving after ingesting 3 or more alcoholic drinks (SRDD). SRDD's average AUDIT score (median=11) was significantly different from those who denied drink driving (median=6, p= 0.03). The PDD showed a high overall stigma, particularly discrimination, against those who use alcohol; but, the PDD was similar for drinkers and abstainers from alcohol (median=2.7 and 3.1, respectively). Thematic content analysis highlighted an 'inability to change those that drink drive, 'disapproving of drink driving', and a 'necessary police enforcement on drink driving.' While stigma is present in Tanzania against those who use alcohol, it

does not impact the choice to drink and drive, and 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.

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List of Abbreviations

AUDIT: Alcohol Use Identification Test

PDD: Alcohol Use Perceived Discrimination-Devaluation Scale

SRDD: Self-reported driving after ingesting 3 or more alcoholic drinks

KCMC: Kilimanjaro Christian Medical Centre

LMIC: Low and Middle Income Countries

BAC: Blood alcohol content

RTI: Road traffic injury

PAS: Perceived alcohol stigma

CAB: Community Advisory Board

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1. Introduction

1.1 Alcohol as a Risk Factor

The majority of countries worldwide have a large proportion of adults who consume alcohol. Alcohol is associated with adverse consequences for the drinker and society at large (*WHO Collaborative Study on Alcohol and Injuries* 2007). Globally, alcohol is causally related to more than 60 diseases, causes 3.2% of all deaths annually, and accounts for 4.0% of the global disease burden (Rehm, Chishol, Room, & Lopez, 2006; *WHO Collaborative Study on Alcohol and Injuries* 2007).

Much of the alcohol-related morbidity and mortality are the result of injuries caused by hazardous and harmful drinking (*WHO Collaborative Study on Alcohol and Injuries* 2007). Of the total number of alcohol attributable deaths, 32% are from unintentional injuries and 13.7% are from intentional injuries (*WHO Collaborative Study on Alcohol and Injuries* 2007). Overall, half of all alcohol-attributable deaths are due to injuries. Studies have estimated the proportion of injuries with alcohol involvement to be between 6% and 45%, depending on the country (*WHO Collaborative Study on Alcohol and Injuries* 2007). Substance use has been shown to not only increase injury risk and severity but also to worsen outcome (Dischinger & Kufera, 2001; Maden & Beech, 1999; Parran & Tasse, 1995; Rehm et al., 2006). Alcohol-related injuries are particularly concerning in LMIC, where consumption rates are increasing, and injury prevention infrastructure is minimal (*WHO Collaborative Study on Alcohol and Injuries* 2007).

In high-income countries, health policy and public health measures have stabilized alcohol use and misuse related consequences, reducing the morbidity and mortality due to alcohol use (*Substance use problems in developing countries*, 2004).

Unfortunately, in stark contrast, many LMICs alcohol use is rising rapidly, with an increase in early onset and excessive drinking due to recent increases in economic growth, increasing access to alcohol (*Substance use problems in developing countries*, 2004).

This cumulative global data highlights the importance of understanding alcohol consumption in a society. This understanding of consumption is largely unknown for Tanzania on the population level. Current data on Tanzanian alcohol consumption focuses on particular high risk groups: in two regions of Tanzania between 11-28% of young males screened positive for an alcohol use disorder (Francis et al., 2015); in the northern region, 21.5% of women reported drinking alcohol while pregnant (Isaksen et al., 2015); alcohol consumption was greater in poorer urban settings than in more affluent cities (Mbatia et al., 2009). Data from Dar es Salaam and Moshi showed that 30% of patients who present to the Casualty Department for an injury and 21% of road traffic injury patients have at risk alcohol use (Boniface et al., 2016, Staton et al., 2015).

1.2 Road Traffic Injuries

Overall, injuries account for about 10% of the world's deaths (*Violence, injuries and disability biennial report 2008-2009*, 2010). Road traffic injuries are one of the top three causes of death for people between 5 and 44 years of age (*Violence, injuries and disability*

biennial report 2008-2009, 2010). RTIs are estimated to cost countries 3-5% of their gross national product due to their strong morbidity on the most economically productive members of most societies. Furthermore, road traffic injuries are expected to rise to the seventh leading cause of death by 2030 (*Road traffic injuries, 2016*). A growing concern for low and middle-income countries is its severe road traffic injury burden; more than 90% of deaths that result from road traffic injuries occur in low- and middle-income countries (*Road traffic injuries, 2016*).

Globally, the road traffic injury death rates are highest in Africa (*Injuries visualizations, 2016*). The road traffic injury burden in Africa is particularly devastating, as Africa only possesses 2% of the world's vehicles, but contributes to 16% of the world's road traffic deaths and has the largest road fatality rate (*Violence and Injury Prevention 2015, 2015*). Vulnerable road users (pedestrians, cyclists, motorcyclists etc) are at particular danger on roads in Africa; they represent over half of the population killed on the roads (*World report on road traffic injury prevention, 2004*).

1.3 Alcohol Stigma

Literature on drinking patterns and excessive alcohol use show that certain demographic groups and social constructs may heavily influence alcohol behavior and perceptions of drinking. Societal-level factors are shown to predict alcohol use (Bloomfield, Gmel, & Wilsnack, 2006). These influences range from personal encounters

with alcohol as well as gender dynamics and societal roles that may dictate appropriate drinking behaviors within a society (Bloomfield, Gmel, et al., 2006).

In addition to societal perceptions, racial and ethnic differences have been shown to create differences in an individual's psychology and behavior as it relates to substance use. This means that in addition to environmental influences on drinking behavior, one's race influences how one adapts and reacts to societal perceptions (Wallance, 1999). One study shows that the dominant influencer of drinking behavior is one's personal relationships (Wallance, 1999). While these general patterns have been observed, the social inequalities related to alcohol use differ across countries (Bloomfield, Grittner, Kramer, & Gmel, 2006). In order to understand alcohol use, and therefore misuse, it is necessary to understand the societal perceptions and social relationships surrounding alcohol in a particular population. The current perceptions in Moshi around alcohol is undescribed—the impact of alcohol stigma on drinking behavior has not been studied in Moshi.

Stigma as it relates to this study, is defined as the negative perceptions surrounding the act of drinking or drink driving or the person or persons that choose to drink drive.

1.4 Drink Driving

While both alcohol consumption and road traffic injuries are increasing in low and middle income countries, data showing an increase in drink driving is sparse

because few countries have the surveillance systems to monitor and report which traffic crashes include alcohol involvement (*Drinking and Driving: A road safety manual for decision-makers and practitioners*, 2007). Drink driving drastically increases the likelihood of a crash, as well as influences post-crash outcome for the driver and potential victims (*Drinking and Driving: A road safety manual for decision-makers and practitioners*, 2007).

Aside from alcohol's direct effect on drinkers, it also affects seat belt and helmet use and drivers' speeds. Compared to motorists with a BAC of 0, motorists that have a BAC over 0.05 g/100ml are at a 40 times higher risk of being in a crash (*Drinking and Driving: A road safety manual for decision-makers and practitioners*, 2007).

Drink driving rates vary between and within countries, but in many countries those that drink are likely to drink drive. Current reporting of drink driving shows that: in Thailand 44% of traffic injury victims had a BAC of 0.10g/100 mg or more; in South Africa 31% of non-fatally injured drivers have BAC levels above the country's limit of 0.08 g/100ml or more and 36% of motorcycle crashes involved alcohol; in Nepal 17% of traffic collisions were attributed to alcohol (*Drinking and Driving: A road safety manual for decision-makers and practitioners*, 2007). There is currently no available literature on how many road traffic injuries in Tanzania are attributable to drink driving.

The WHO reports that the highest at-risk group for drink driving is those who have previously drink drove or those who drink four to five drinks per sitting (*Drinking and Driving: A road safety manual for decision-makers and practitioners*, 2007). Additionally,

at risk groups are usually identified based on demographic characteristics and behavioral attributes, which vary by country. This makes understanding the drinking and drink driving population, and what may lead one's decision making in drink driving, particularly valuable information to reduce drink driving or RTI's attributable to alcohol consumption.

1.5 Study Aims and Hypothesis

More information is needed in the following three areas: 1) what are the drinking behaviors of injury patients that drink and drive, 2) how drinking stigma is perceived, and 3) how drinking perceptions influence drink driving in Moshi, Tanzania. We describe the risky behavior of injury patients, assess the perception of alcohol stigma within different populations, and determine how drinking stigma is perceived to affect risky driving behavior. The purpose of this project was to assess how drinking culture influences drink driving. We hypothesize that those that drink drive have high risky drinking behaviors among this at risk population and that there is a drinking culture that does not discourage drink driving.

2. Methods

This mixed method study will examine the perceptions of drink driving within a high risk population for which preliminary quantitative survey data informed qualitative focus group questions. Quantitative data collected was from surveys administered to injury patients who reported if they had previously drink drove or had not. Their answer to this binary question placed them in the drink drive injury population group or the non-drink driver injury population group. The surveys assessed risky drinking behavior and perceptions of drinking among these high-risk injury patients. Focus groups conducted among injury patients, their family members, and community advisory board (CAB) members helped to explain survey's results as well as overall drink drive perceptions, as seen in Figure 1. R software was used to analyze survey data ("The R Project for Statistical Computing," 2016). For the study, we obtained IRB approval from the Duke Institutional Review Board, Kilimanjaro Christian Medical Center Ethics Committee and National Institute of Medical Research. There was a minimal level of risk for this study. To ensure privacy, names or identifying information of participants were not collected.

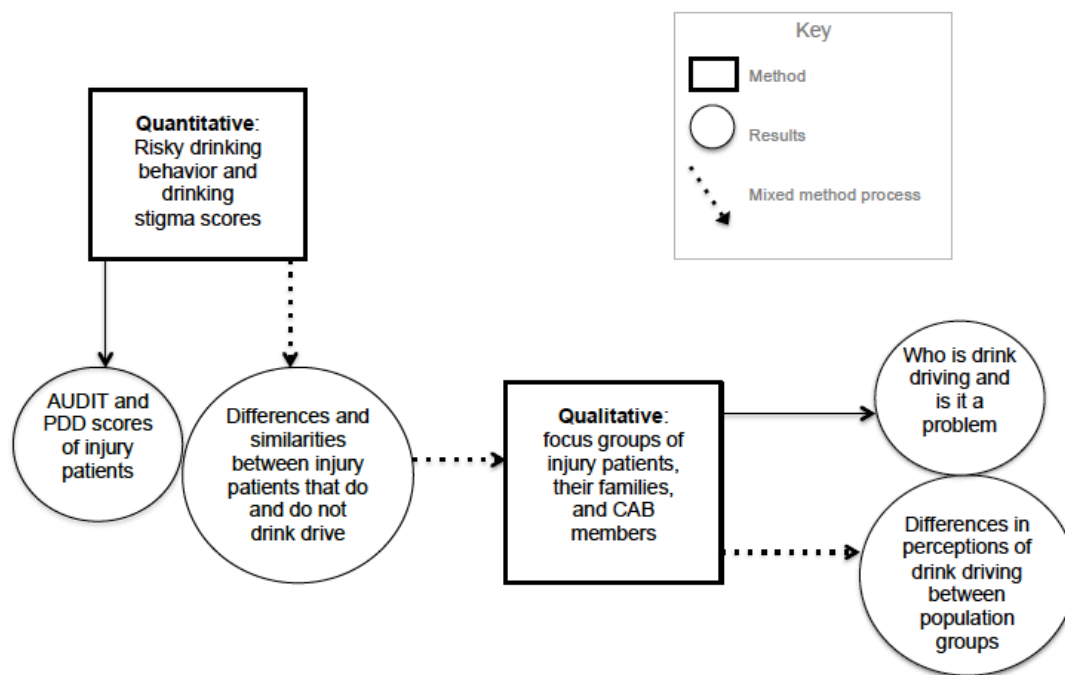


Figure 1: Flow Diagram of Mixed Method Approach

2.1 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, Mvungi, & Mmbaga, 2016). KCMC serves the heterogeneous population of Moshi and was therefore selected as a central location to assess general perceptions of the region. 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 Casualty (Emergency) Department suggests that 28% of all the patients who arrive to the Casualty

Department for treatment of an injury consumed alcohol prior to their injury and therefore are 'Hazardous drinkers' (Staton et al., 2015).

2.2 Injury Population

This study assessed the perception of drink driving and sought to understand the drinking behavior of those that drink and drive, among the injury population. Injury patients were chosen as the population of interest because they are at high risk for risky behaviors and drink driving (*WHO Collaborative Study on Alcohol and Injuries* 2007). This improves 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. Tangentially, on a larger scale, focus groups among patients, their families and community members described the community and social relationships with and perceptions of drink driving.

Injury patients are a vulnerable population, as they have already suffered the repercussions of risky behavior, within the community that are at higher risk for risky behavior, specifically drink driving and involvement in road traffic crashes (*Violence, injuries and disability biennial report 2008-2009*, 2010). Due to this high risk among injury patient populations, they are an important target for future drink driving interventions. Additionally, due to the nature of alcohol interventions, utilizing various negotiation and reasoning techniques to trigger individual support for a change in behavior, an understanding of how a patient's drinking behavior fits into their society is imperative

(Kilmas et al., 2014; Ockene, Adams, Hurley, Wheeler, & Hebert, 1999). The success of an alcohol intervention rests on the community support for alcohol-reduction activities.

2.3 Quantitative Methods

A quantitative understanding of drinking behavior as it relates to drink driving was assessed through the comparison of Alcohol Adapted Perceived Discrimination-Devaluation scale (PDD) and the Alcohol Use Disorders Identification Test (AUDIT). These scaled scores were used to understand drinking stigma and drinking behavior among the vulnerable injury population and the drinking perceptions influencing drink driving.

2.3.1 Participant Selection

The sample size for the survey portion of this project was calculated based on previous literature assessing perception differences among drink drivers and non drink drivers (Albery and Guppy, 1996). To detect a small effect size with 80% power 10 drink drivers and 39 non-drink drivers must be surveyed. In order to reach this sample we enrolled 102 patients from the KCMC ED to participate in the surveys. Patients were enrolled in a convenience sampling during 70 hours a week. Patients arriving outside of those hours were also checked for eligibility. Approximately 95% of patients arrive during the daily enrollment times.

All participants were ≥ 18 years of age and were native Swahili speakers. We excluded patients who were unable to respond to the survey due to the severity of their

injury. 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 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.

All patients were required to give informed consent. Full disclosure in Kiswahili was given to patients in both written and oral form; the purposes of the study was explained to each subject. All risks were clearly expressed to each patient who voiced their understanding.

Prior to signing, patients were given the opportunity to ask questions and have them answered to their satisfaction. Written consent authorization was obtained from all patients prior to any study procedures being done. Subjects, who were illiterate, or minimally literate, had the Kiswahili consent form verbally summarized by the study staff. Participation was voluntary and each patient was able to drop out at any time for any reason.

2.3.2 Measures

This mixed methods study incorporated the Alcohol Adapted Perceived Discrimination-Devaluation scale (PDD) and the Alcohol Use Disorders Identification Test (AUDIT). Additionally demographic characteristics were collected.

2.3.2.1 Alcohol Use Disorders Identification Test

The AUDIT is an instrument to assess problem drinking (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001). The scale asks questions which evaluate alcohol dependence, hazardous, and harmful alcohol use (Babor et al., 2001). The AUDIT is a 10-item self-reported scale [range 0-40], a score of 8 or above has a 85% sensitivity and 89% specificity, measuring harmful or at-risk drinking in high-income country settings.(Anderson, Gogineni, & Charuvastra, 2001; Cherpitel, 1995) It is reported that scores between 8 and 15 suggest the need for simple advice focused on the reduction of hazardous drinking. Scores between 16 and 19 suggest the need for brief counseling and continued monitoring of drinking behavior, and a score of 20 or higher suggests severe alcohol dependence which requires more in depth evaluation and counseling in order to address the drinking behavior (Babor et al., 2001).

The AUDIT was developed by the WHO, who standardized the scale for six countries: Norway, Australia, Kenya, Bulgaria, Mexico, and the United States of America (Babor et al., 2001). However, despite this cross-national standardization, scale developers claim the cut-off scores likely vary depending on country's drinking patterns, alcohol content of drinks, and the environment in which the screening scale is utilized (Babor et al., 2001). Other studies support the variability of AUDIT score cutoffs among varying countries, ethnic groups within countries, and subset populations (de Meneses-Gaya, Zuardi, Loureiro, & Crippa, 2009). Despite this cutoff variation the

lowest sensitivity and specificity the AUDIT yielded was 0.76 and 0.79, respectively, assessed against DSM-IV classification, which is higher than the other largely cited alcohol behavior instruments (de Meneses-Gaya et al., 2009). Based on the potential variability of appropriate AUDIT cutoffs, and that the AUDT has not been appropriately validated for the KCMC population, the total AUDIT score medians were reported to compare relative differences in risky behavior drinking.

2.3.2.2 Alcohol-Adapted Perceived Devaluation-Discrimination

The twelve question alcohol-adapted Perceived Devaluation-Discrimination scale (PDD) assess the construct of an individual's perceived alcohol stigma (PAS) (Glass et al., 2013). Seven of the PDD questions assess perceived discrimination of those that drink excessively, in a way that controls their life, and five of the questions assess perceived devaluation of those that excessively drink. Perceived discrimination is the perception that one is treated poorly due to their alcohol use. Perceived devaluation is the way one may be less valued because of their alcohol use. Responses are measured with a six-point Likert scale ranging from strongly agree to strongly disagree. To reduce response bias six questions are worded with reverse meaning, then recoded so higher scores consistently indicate higher levels of PAS (Glass et al., 2013). There is a one factor and two factor analytic approach to PDD. The one factor analysis assesses a summative alcohol stigma through perceived devaluation-discrimination, producing an individual score, averaged to 6, while the 2-factor approach analyzes alcohol stigma by separating

the devaluation and discrimination components of perception, producing two scores, each ranging from 1-6 (2013). Since PDD use in Tanzania has not been validated in the literature both the one and 2-factor approach results were reported.

The PDD is designed to assess the expectations of devaluation and discrimination by asking how “most other people” think and act toward a person with alcohol problems (Glass et al., 2013). An average score of 3 or greater has been cited in the literature to reflect high stigma toward a behavior (Ritsher and Phelan, 2004, Ritsher et al., 2003, Link et al., 1991). PDD has been used on high risk-drinkers as well as abstainers (Keyes et al., 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 et al., 2013). Therefore this scale was used to assess the potential feasibility of alcohol interventions in high risk groups. In other cultures the scale shows good psychometric properties (Ruan et al., 2008, Luoma et al., 2010).

2.3.3 Quantitative Analysis

Data was collected by two trained research nurses who underwent a week long training in medical ethics, background for tools and how to administer tools, and project protocol. Survey answers were collected on paper forms, then checked for completeness and error when entered into a REDCap database. Secondary quality control was performed when the data set was reviewed after primary entry, then finally reviewed and outliers were highlighted during data analysis. Data was analyzed using R data

software ("The R Project for Statistical Computing," 2016). Descriptive statistics (frequencies and percentages), including whether a patient has previously drink drove, were compiled from demographic information. Age was reported as a mean with standard deviations. AUDIT scores were compared between those that drink drive and those that do not, PPD scores were compared between those that drink drive and those that 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 $\alpha < 0.05$.

2.4 Qualitative Methods

A qualitative understanding of the drink and drive 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 that do and do not drink drive.

2.4.1 Study Design

The semi-structured focus group was designed based on the 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 and Strauss, 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 else, drink and drive. Focus groups were conducted between August 2016 and January 2017.

2.4.2 Research Team and Reflexivity

Focus groups were conducted by two trained female research nurses at KCMC. The research nurses had 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.

2.4.3 Participant Selection

Focus groups participants were a convenience sample of injury patients, their families, and community advisory board 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 to the Casualty Department 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 member focus groups so that they 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, have advised investigators on pertinent research questions, cultural norms, and cultural acceptability of interventions, treatments and research protocols.

2.4.3.1 Recruitment Criteria

Injury patients were included in the focus groups if they were ≥ 18 years of age, seeking care at KCMC for an acute (<6 hours) injury, clinically sober at the time of enrollment, medically stable, able to communicate in Swahili or English and consent to participate. Patients were excluded from enrollment if they were medically unstable or had a deteriorating condition, were too critically ill to participate, did not speak English or Swahili, were <18 years of age, presented for non-injury related complaints, or did not consent to be enrolled.

Family member focus group participants were family members of a patient who was able to be enrolled in the study, who also agreed to participate, and speak English

or Swahili. For CAB member focus groups, all interested participants were enrolled who were ≥ 18 years of age and were present at the CAB meeting when we conducted the focus group discussion.

2.4.4 Focus Group Procedures

For the patient and family member focus groups, once 5-10 eligible interested participants were recruited in the emergency department, focus groups were scheduled in a quiet room close by the emergency department. Focus groups lasted between 45 and 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, led by trained research nurses, 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 into the transcriptions about the content.

CAB focus groups took place at the CAB meetings and consisted of 5 to 10 members. Members took part in an informed consent process and 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 to the study original focus group questions were designed to understand the general perceptions of drink driving in Moshi Tanzania. These scripted questions included "What is acceptable drinking behavior?"

and “What is thought of a person who drink and drives?”. These scripted questions were piloted by the research nurses conducting 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 assessed for potential cultural misinterpretations, back translated and annotated for English, American comprehension. All transcripts, audio tapes, and related data will be kept for six years after study completion.

2.4.5 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 analyzed. Comparing and contrasting across and within these datasets highlighted emerging themes and divergence of perspectives (Kendall et al., 2009). Thematic saturation was 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 (Reissman, 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.

3. Results

3.1 Quantitative Results of Comparison between Drink Drivers and Non-Drink Drivers

In total 102 injury patients were surveyed, 96 completed the survey and were therefore included in PAS analysis. Of those who completed the survey, 58 patients drink alcohol or were previously alcohol drinkers and were therefore included in our analysis of drinking behavior and drink driving.

Basic demographic, injury, and drinking characteristics showed that the study population was primarily middle-aged males as seen in Table 1.

Table 1: Injury Patient Demographic Information

	Total (n=96)	Drink drove (n=9)	Did not drink drive (n=58)	Non-drinkers (n=29)
Age, Mean (SD)	37.1 (14.1)	33.3 (13.1)	39.3 (14.6)	33.8 (13.0)
Male, N (%)	82 (85)	9 (100)	52 (90)	21 (72)
Self reported alcohol before injury, N (%)	19 (20)	2 (22)	16 (28)	1 (3)
Positive breathalyzer Count (%)	9 (9)	-	9 (16)	-
MVC cause primary injury Count (%)	60 (62)	4 (44)	38 (66)	18 (62)
AUDIT, Median (IQR)	3.0 (0.0;9.0)	10.0 (9.0;15.0)	4.5 (2.0;10.0)*	-

The AUDIT of drink drivers had a median value of 10 (9.0;15.0) while the median AUDIT score of non-drink drivers was 4.5 (2.0;10.0). The AUDIT scores between these two groups was shown to be significantly different base on the Wilcoxon rank sum test ($p=0.032$) (Figure 2).

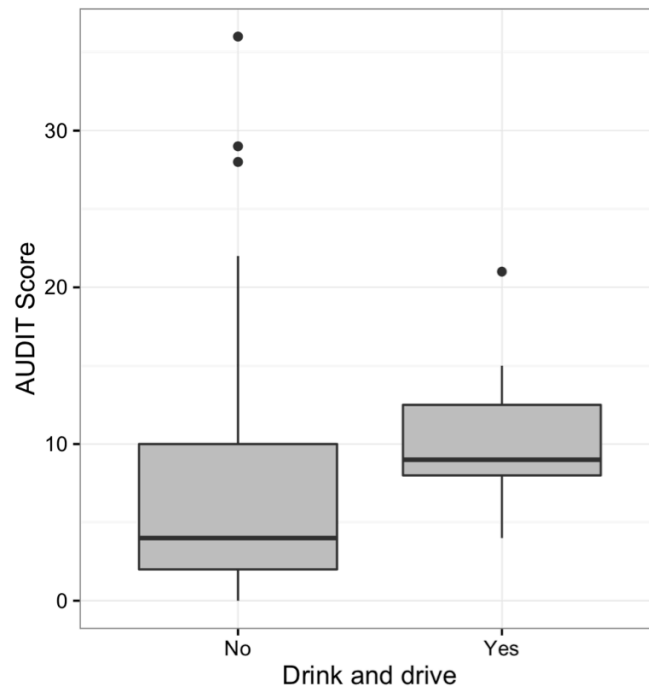


Figure 2: AUDIT Score Comparison of Drink Drivers and Non-Drink Drivers

The PDD of drink drivers had a median value of 2.7 (2.1;3.7) while the median PDD score of non-drink drivers was 3.1(2.7;3.5) as seen in Table 2. The PDD scores, both one-factor and two-factor, between these two groups was not significantly different as seen in Figure 3. The discrimination and devaluation PDD scores also showed no difference between groups when discrimination and devaluation were analyzed

separately. While the PDD was similar for all three groups, the PDD showed alcohol stigma, particularly discrimination, against those who use alcohol.

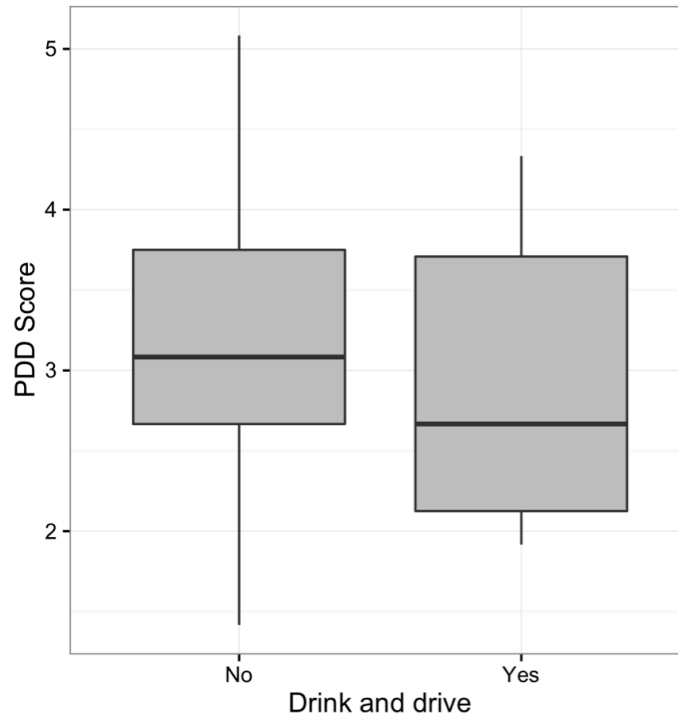


Figure 3: PDD Score Comparison of Drink Drivers and Non-Drink Drivers

Table 2: Alcohol-Adapted Perceived Devaluation-Discrimination Scale

	Total (N=96)	Drink drove (N=9)	Did not drink and drive* (N=58)	Non-drinkers (N=29)	Kruskal Wallis P-value
PDD scale Median (IQR)	3.1 (2.7;3.8)	2.7 (2.1;3.7)	3.1 (2.7;3.5)	3.1 (2.7;3.8)	0.711
Devaluation Median (IQR)	3.0 (2.3;3.3)	3.0 (2.1;3.1)	3.0 (2.5;3.1)	2.6 (2.3;3.4)	0.849
Discrimination Median (IQR)	3.6 (3.0;4.2)	3.0 (2.6;4.4)	3.6 (3.0;4.0)	3.9 (3.0;4.3)	0.565

*injury patients that are drinkers but did not self-reportedly drink drive

3.2 Qualitative Results of Perceptions of Drink Driving

3.2.1 Demographics and Characteristics of Participants

A total of 6 patient, 6 family, and 2 CAB focus groups were conducted. After 4 patient, 4 family, and 2 CAV focus groups were conducted, thematic saturation was reached, and the focus group script was altered to expose reasons for preliminary data from patient surveys. With the modified script 2 patient, 2 family focus groups were conducted before thematic saturation was reached.

3.2.2 Emerging Themes and Related Quotes

Focus group discussions between all three population types highlighted major themes of 'passiveness toward drinking and drink driving', 'disapproving of drink drivers, and a 'necessary police enforcement on drink driving'.

3.2.2.1 'Passiveness toward drinking and drink driving' Theme

A prominent theme in all three focus group types was an inability to change those that drink and drive, or an acceptance of their behavior, to a certain extent. This belief that there is no way to change drink drivers was demonstrated when participants spoke of drink drivers inability to listen, their standoff approach or 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 one participant said that drink drivers *“do not listen to anyone or ask for any assistance”*.

Another participant cited a time he tried to reason with a drink driver, not to drive and stated that: *“we tried to advise him but he said he can’t stop drinking until he dies”*. Others had given up hope in trying to change drink driver behaviors saying that *“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 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 that is choosing to drink drive. For example a participant 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 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 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 and driver's inability to be function without alcohol, and used this behavior as rational or an understanding for their choice to drink drive. For example a participant 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 conductors, daladala driver, bodaboda 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 participant said that a taxi driver he knows needs alcohol to be productive. He *"cannot start working without drinking."*

3.2.2.2 'Disapproving of drink drivers' Theme

Another common theme during the focus groups was an overall disapproval of those that drink drive. Very specifically this disapproval was targeted at those that drink drive and did not refer to the act of drink driving. This disapproval was shown in commentary about drink drivers character and behavioral traits. Notably, the participants showed a particular judgment of bodaboda drivers and their tendency to drink drive.

Statements about the personality of those that drink and drive including claiming that those that drink and drive "*are not civilized*" or that the type of person that drink drives is "*very bad*". However some of these negative commentary reasoned the drink driving to be due to poor character or ignorance. For example a participant 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*". Another participant 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 those who drive boda bodas. The exemplar for these negative character traits was often times these 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 bodaboda and give it to a child to work with it when a child is coming from school. Therefore*

when he drive bodaboda he also drinking alcohol, therefore to get alcohol is very easy for this age."

The community of bodaboda drivers is thought to breed drink driving behavior. *"I am able to say this. Even these ones 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 bodaboda people, I do not think that there is stigma."* A bodaboda driver 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 bodaboda is belonging to someone else then we can return it back to the owner"*.

3.2.2.3 'Necessary police enforcement on drink driving' Theme

The final major contributing theme during the perceptions of drink driving focus groups was a feeling that there must be 'Necessary police enforcement on drink driving'. This conversation about enforcement was a belief that a citizen should inform police if they see drink driving, however, there was disagreement about how much can be and is done by the police if they are informed drink driving is occurring.

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 participant said *"Passengers should be very careful with a drunk driver. They should inform the police traffic immediately."* Another participant 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 their driver had been drinking. For example: *"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 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 said by [my peer] is what is supposed to be done but that is not how we are doing."* Another participant 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."*

4. Discussion

This study revealed that the injury patients who self-reported drink driving have a significantly higher risky drinking behavior than those that do not. Additionally, there is a high drinking stigma among those who do and do not drink drive. Discussion surrounding drink driving in qualitative focus groups primarily addressed the behavior of those that drink drive and how it affects the community rather than what leads to drink driving or what factors of drinking behavior influence drink driving.

The population of injury patients that reported drink driving scored significantly higher on the AUDIT, a scale assessing hazardous drinking behavior, than those that 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 consistent with trends observed in other alcohol-using populations (de Meneses-Gaya et al., 2009 , 2007). What makes this valuable is its contribution to what we know about the community that drink drives in the population. This shows that in Tanzania, as has been shown in other regions, but not previously in sub-saharan Africa, that drink driving is particularly prevalent among risky drinkers(2007). This supports the difference seen among those that do and do not drink drive and reveals that the AUDIT score can be a predictive measure of drink driving behavior. While the AUDIT is an assessment of risky drinking behavior, none of its questions specifically refer to drink driving behavior (Babor et al., 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 et al., 1994, Ozkan et al., 2006, Jewell et al., 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 and those that do not, within both groups more than 50% of patients showed high levels of stigma. The median PDD value of 3.1 was observed among all injury patients, both if they drink drive, do not, or abstain. This value of 3.1 represents that there is a level of overall stigma toward those who drink (Ritsher and Phelan, 2004, Ritsher et al., 2003, Link et al., 1991). A previous study assessing PAS across various alcohol use disorder levels, within one environment, also showed no significant PAS difference across groups (Glass et al., 2013b). This suggests that if risky drinking behavior exists, it is not likely a difference in stigma that alters the severity of risky drinking, or particularly for this study, stigma may not be the factor that deters an at-risk drinker from drink driving. Drinking stigma is not unique to this region, and current research suggests that moderate stigma surrounding a risky behavior may reduce the spread of harmful behavior (2007, Livingston et al., 2012). However, how strong a stigma is required to have this positive effect is unclear, and such a stigma may do more harm for the problem drinkers within that community (Livingston et al., 2012). 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 et al., 2010). As this population does not exhibit this disproportionately high stigma trend, we do not suspect stigma to deter a risky drinker in this setting from seeking treatment. Further research is necessary to see how this pattern of stigma affects problem drinker and drink drivers in Tanzania.

This negative perception of drinking was also present in focus group themes, which echoed the belief that those who drink drive are consciously making bad decisions and have character flaws, as is seen with alcohol and other substance use stigma in other populations (Bloomfield, Gmel, & Wilsnack, 2006). Addiction, or an inability to control one's drinking was not spoken of when drink drivers were being depicted. Such a stigma, that does not recognize addiction as a disease, may have detrimental effects on alcoholics in this society. All of those that drink drive had a significantly higher audit score than those that did not which shows they are hazardous drinkers or potential alcoholics(Stuber et al., 2008). Those that are suffering from alcoholism in a society that blames those that drink likely have a harder time seeking and receiving care for their addiction (2007, Stuber et al., 2008). Focus groups among the three Tanzanian population groups also discussed what should be done to minimize drink drivers in the population. Participants put the responsibility of identifying drink drivers or deterring drink driving on police not civilians, or drinkers' 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 shown to affect one's choice to drink drive (MacLeod et al., 2015). Drink driving interventions targeted at the high risk injury population, as well as education on alcoholism and addiction may be the best approaches to reduce drink driving behavior and their associated risks in Tanzania.

4.1 Implications for Policy and Practice

This study assessed how drink driving is affecting injury patients due to their high risk for future injury and perceptibility to addiction and was designed to inform future interventions or policy to reduce drink driving (Demetriades & Velmahos, 2004). Results showed that there is a generally negative societal perception of drink driving but that there are few resources or support system for someone who practices risky drinking behavior. This understanding of the culture should shape the intervention programs to be used in the setting.

4.2 Implications for Further Research

Future research should focus on understanding the epidemiology of drink driving, a more accurate way of assessing the proportion of drink drivers, and a better understanding of how police are or not enforcing drinking policy.

4.3 Study Strengths and Limitations

This study was limited by its use of a single 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. However, calculated a priori, in order to see an PDD effect with 80% power, we required 10 drink driver participants. There were 9 drink driver participants assessed and significantly no difference in PDD scores.

The strength of this study were its mixed method design which revealed drink driving behavior in an environment that such behavior had not been previously assessed or depicted in the literature. In addition, this study was conducted among an injury population that is among a particularly high risk group with established infrastructure, ready for intervention program implementation.

5. Conclusion

While negative perceptions are present in Tanzania against those who use alcohol, it may not impact the choice to drink and drive, and 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.

References

- Albery, I., & Guppy, A. (1996). Drivers' biased perceptions of the adverse consequences of drink-driving. *Drug Alcohol Review, 15*(1), 39-45.
- The alcohol-adapted Perceived Devaluation-Discrimination scale. Retrieved from
- ALBERY, I. & GUPPY, A. 1996. Drivers' biased perceptions of the adverse consequences of drink-driving. *Drug Alcohol Review, 15*, 39-45.
- Anderson, B., Gogineni, A., & Charuvastra, A. (2001). Adverse drinking consequences among alcohol abusing intravenous drug users. *Alcohol Clin Exp Res, 25*, 41-45.
- Babor, T., Higgins-Biddle, J., Saunders, J., & Monteiro, M. (2001). The Alcohol Use Disorders Identification Test. Retrieved from Geneva:
- Bloomfield, K., Gmel, G., & Wilsnack, S. (2006). Introduction to special issue 'Gender, Culture and Alcohol Problems: a Multi-national Study' *Alcohol and Alcoholism, 41*(1), 3-7.
- Bloomfield, K., Grittner, U., Kramer, S., & Gmel, G. (2006). Social inequalities in alcohol consumption and alcohol related problems in the study countries of the EU concerted action 'Gender Culture and Alcohol Problems: a Multi-national Study'. *Alcohol and Alcoholism, 41*(1), 26-36.
- Boniface, R., Museru, L., Kiloloman, O., & Muthali, V. (2016). Factors associated with road traffic injuries in Tanzania. *Pan African Medical Journal, 23*(46).
- Cherpitel, C. (1995). Analysis of cut points for screening instruments for alcohol problems in the emergency room *Journal Stud Alcohol, 56*, 695-700.
- Corbin, J., & Strauss, A. (1990). Grounded theory method: Procedures, canons and evaluation criteria. *Qualitative Sociology, 13*, 3-21.
- de Meneses-Gaya, C., Zuardi, A., Loureiro, S., & Crippa, J. (2009). Alcohol Use Disorders Identification Test (AUDIT): An updated systematic review of psychometric properties. *Psychology & Neuroscience, 2*(1), 83-97.
- Demetriades, D., & Velmahos, G. (2004). Alcohol and illicit drugs in traumatic deaths: prevalence and association with type and severity of injuries. *Journal of the American College of Surgeons, 199*, 687-692.

- Dischinger, P., & Kufera, J. (2001). A longitudinal study of former trauma center patients: the association between toxicology status and subsequent injury mortality. *Journal of trauma*, 51, 877-884.
- Drinking and Driving: A road safety manual for decision-makers and practitioners.* (2007). Retrieved from Geneva:
- Francis, J., Weiss, H., Mshana, G., Baisley, K., Grosskurth, H., & Kapiga, S. (2015). The Epidemiology of Alcohol Use and Alcohol Use Disorders among Young People in Northern Tanzania. *Plos One*, 10(10).
- Glass, J., Kristjansson, S., & Bucholz, K. (2013). Perceived alcohol stigma: factor structure and construct validation. *Alcoholism, Clinical and Experimental Research, Suppl 1*.
- Glass, J., Mowbray, O., Link, B., Kristigansson, S., & Bucholz, K. (2013). Alcohol stigma and persistenc of alcohol and other psychiatric disorders: a modified labeling theory approach. *Drug and alcohol dependence*, 133(2), 685-692.
- Injuries visualizations.* (2016). Retrieved from University of Washington:
- Isaksen, A., Ostybe, T., Mmgbaga, B., & Daltveit, A. (2015). Alcohol consumption among pregnant women in Northern Tanzania 2000-1010: a registry-based study. *BMC Pregnancy and Childbirth*, 15(205).
- Jewell, J., Hupp, S., & Segrist, D. (2008). Assessing DUI risk: Examination of the Behaviors & Attitudes Drinking & Driving Scale (BADDs). *Addictive Behaviors*, 33(7), 853-865.
- Kendall, M., Murray, S., Carduff, E., Worth, A., Harris, F., Lloyd, A., . . . Sheikh, A. (2009). Use of multiperspective qualitative interviews to understand patients' and carers' beliefs, experiences, and needs. *BMJ*, 339.
- Keyes, K., Hatzenbuehler, M., McLaughlin, K., Link, B., Olfson, M., Grant, B., & Hasin, D. (2010). Stigma and Treatment for Alcohol Disorders in the United States. *American Journal of Epidemiology*, 172(12), 1364-1372.
- Kilmas, J., Tobin, H., Field, C., O'Gorman, C., Glynn, L., Keenan, E., . . . Cullen, W. (2014). Psychological interventions to reduce alcohol consumption in concurrent probem alcohol and illicit drug users. *Cochrane Database*, 12.

- Link, B., Mirotznik, J., & Cullen, F. (1991). The effectiveness of stigma coping orientations: can negative consequences of mental illness labeling be avoided. *Journal of Health and Social Behavior*, 32(2), 302-320.
- Livingston, J., Milne, T., Fang, M., & Amari, E. (2012). The effectiveness of interventions for reducing stigma related to substance use disorders: a systematic review. *Addiction*, 107(1), 39-50.
- MacLeod, K., Darriker-Jaffe, K., Ragland, D., Satariano, W., Kelley-Baker, T., & Lacey, J. (2015). Acceptance of drinking and driving and alcohol-involved driving crashes in California. *Accident Analysis and Prevention*, 81, 134-142.
- Maden, A., & Beech, D. (1999). Alcohol and drug use in victims of life-threatening trauma. *Journal of trauma*, 47, 568-571.
- Malterud, K. (2001). Qualitative research: standards, challenges, and guidelines. *Lancet*, 358(9280), 483-488.
- Mbatia, J., Jenkins, R., Singleton, N., & White, B. (2009). Prevalence of Alcohol Consumption and Hazardous Drinking, Tobacco and Drug Use in Urban Tanzania, and Their Associated Risk Factors. *International Journal of Environmental Research and Public Health*, 6(7), 1991-2006.
- Ockene, J., Adams, A., Hurley, T., Wheeler, E., & Hebert, J. (1999). Brief physician- and nurse practitioner-delivered counseling for high-risk drinkers: does it work? *Archives of Internal Medicine*, 159(18), 2198-2205.
- Ozkan, T., Lajunen, T., & Summala, H. (2006). Driver behaviour questionnaire: A follow-up study. *Accident Analysis and Prevention*, 38, 386-395.
- Parran, T., & Tasse, J. (1995). Mandatory toxicology testing and chemical dependence consultation follow-up in a level-one trauma center. *Journal of trauma*, 38, 278-280.
- The R Project for Statistical Computing (Version 3.3.0). (2016): The R Foundation. Retrieved from <https://www.r-project.org/>
- Rehm, J., Chishol, D., Room, R., & Lopez, A. (2006). *Alcohol Disease Control Priorities in Developing Countries*. New York: Oxford University Press.
- Reissman, C. (1993). *Narrative analysis*: Sage.

- Ritsher, J., Otilingam, P., & Grajales, M. (2003). Internalized stigma of mental illness: psychometric properties of a new measure. *Psychiatry Research, 121*(1), 31-49.
- Ritsher, J., & Phelan, J. (2004). Internalized stigma predicts erosion of morale among psychiatric outpatients. *Psychiatry Research, 129*, 257-265.
- Road traffic injuries*. (2016). Retrieved from Geneva:
- Smith, S., Dawson, D., Goldstein, R., & Grant, B. (2010). Examining Perceived Alcoholism Stigma Effect on Racial-Ethnic Disparities in Treatment and Quality of Life Among Alcoholics. *Journal of Studies on Alcohol and Drugs, 71*(2), 231-236.
- Stacy, A., Bentler, P., & Flay, B. (1994). Attitudes and health behavior in diverse populations: Drunk driving, alcohol use, binge eating, marijuana use, and cigarette use. *Health Psychology, 13*(1), 73-85.
- Staton, C., Msilanga, D., Kiwango, G., Vissoci, J., de Andrade, L., Lester, R., . . . Mvungi, M. (2015). A prospective registry evaluating the epidemiology and clinical care of traumatic brain injury patients presenting to a regional referral hospital in Moshi, Tanzania: challenges and the way forward. *International Journal of Injury Control and Safety Promotion, 1-9*.
- Staton, C., Mvungi, M., & Mmbaga, B. (2016). *Developing a Brief Negotiational Intervention for Alcohol in Tanzania*.
- Stuber, J., Meyer, I., & Link, B. (2008). Stigma, prejudice, discrimination and health. *Social Science and Medicine, 67*(3), 351-357.
- Substance use problems in developing countries*. (2004). Retrieved from Geneva:
- Violence and Injury Prevention 2015*. (2015). Retrieved from Regional Office for Africa:
- Violence, injuries and disability biennial report 2008-2009*. (2010). Retrieved from Geneva:
- Wallance, J. (1999). The social ecology of addiction: race, risk, and resillience. *Pediatrics, 103*, 1122-1127.
- WHO Collaborative Study on Alcohol and Injuries* (2007). Retrieved from Geneva:
- World report on road traffic injury prevention*. (2004). Retrieved from Geneva: