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Prevalence and risk factor for injury in sub-Saharan Africa: a multicountry study

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ABSTRACT

Introduction Injury-related morbidity is a neglected health concern in many low-income and middle-income countries. Most injury data in Africa have been collected from hospital-based studies, and few studies have occurred across multiple countries. Using data from a novel cohort, we examined the prevalence and incidence of serious injuries and associated risk factors across five sites in sub-Saharan Africa (SSA).

Methods A common baseline and follow-up survey was administered to participants. The study population included 1316 persons at baseline and 904 persons at follow-up. Frequencies were calculated, and logistic regression models were used to assess risk factors for injury.

Results A total of 233 (17.7%) persons reported a serious injury at baseline and 60 (6.6%) reported a serious injury 6 months later at follow-up. Sixty-nine per cent of participants responded to the follow-up questionnaire. At baseline and follow-up, the most common cause of serious injury at urban sites was transport related, followed by poison/overdose. In rural Uganda, sharp instruments injuries were most common, followed by transport-related injuries. Living at an urban site was associated with an increased odds for serious injury compared with those at the rural site (OR: 1.83, 95% CI 1.15 to 2.90). Participants who consumed above a moderate amount of alcohol were at a higher risk of serious injury compared with those who did not consume alcohol (OR: 1.86, 95% CI 1.02 to 3.41). High level of education was an important risk factor for injury.

Conclusion At baseline and follow-up, common causes of serious injury were transport related, sharp instrument and poison/overdose. Alcohol consumption, urban location and education are important risk factors for injury. It is feasible to collect longitudinal injury data using a standardised questionnaire across multiples sites in SSA. Longitudinal data collection should be leveraged to obtain robust data on risk factors for injury in SSA.

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INTRODUCTION

Injury-related morbidity is rapidly increasing worldwide despite being viewed as largely preventable. In 2004, road traffic injuries (RTIs), violence and self-inflicted injury were among the top 20 leading causes of burden of disease globally with a projected 28% increase by 2030.[1 2] Compared with high-income countries, low and middle-income countries (LMIC) experience a disproportionally greater burden of disability due to injury. Of the 138 million disability-adjusted life years lost to unintentional injuries in 2004, over 90% occurred in LMIC.[1]

Research on injuries in Africa is a neglected area. Most injury data are collected from hospital-based studies and police data. Indeed, hospital records in Africa are often limited due to a lack of access to hospitals and inadequate record keeping systems. Such limitations likely contribute to a regional underestimation of injury-related morbidity. This lack of data makes it difficult to design effective intervention strategies for injury prevention. To the best of our knowledge, no multicountry community-based studies have sought to describe risk factors for injuries in sub-Saharan Africa.

Current data suggest that risk factors for injury vary between high-income and LMIC. While RTIs are one of the most common burdens of injury among all World Health Organization (WHO) regions, in Africa, more than 50% of RTI-related deaths are among pedestrians and other vulnerable road users compared with 15% or less in American and European regions.[3 4] Furthermore, burn-related injuries in high-income countries are more likely due to scalds as opposed to open-flames in low-income countries. Suicides are the largest source of intentional injury burden in high-income countries, whereas in LMIC, violence and war are larger sources.[3]

The aim of this study is to determine the prevalence and identify risk factors for injury in Uganda, Tanzania, Nigeria and South Africa by using pilot data from a novel cohort initiated by The Africa/Harvard School of Public Health Partnership for Cohort Research and Training (PaCT). PaCT is a pilot cohort, the first of its kind, aimed at assessing the feasibility of establishing a multicountry chronic diseases longitudinal cohort in sub-Saharan Africa. These types of cohorts have long been established around the world, but to date, none exist in Africa.[5] As SSA undergoes an epidemiological transition in which non-communicable diseases (NCDs) become the major burden or morbidity and mortality, the need for such a cohort becomes more evident.[6] This cohort will leverage mobile phone technology, overcoming the challenges of tracking transient populations in low-resource environments.

Data on injury were collected as part of the overarching goal of the cohort. Baseline and follow-up data were collected 6 months apart to assess the

feasibility of collecting longitudinal injury data using a standardised questionnaire across multiples sites in sub-Saharan Africa. This study serves as the foundation for a future cohort that aims to move away from the standard descriptive epidemiological approach, towards a more complex and dense longitudinal study design that can assess the causality of NCDs in Africa.

METHODS

Study area, sampling procedures and data collection

The common baseline and follow-up questionnaire for the PaCT pilot study included participants from Tanzania, Nigeria, South Africa and two sites in Uganda who responded to questions on injuries. A more detailed description of the questionnaire and participant recruitment has been published.[7] Participants from Tanzania were schoolteachers recruited from 18 randomly selected public schools in Dar es Salaam. Participants from Uganda were enrolled from two geographic regions: a periurban community and a rural community. In urban Uganda, participants were recruited from their homes in 13 randomly selected villages. In rural Uganda, the study team enumerated the number of households in each village, and then randomly selected homes to be included. In Nigeria, nurses were recruited from two urban hospitals. In South Africa, teachers were recruited from 111 government schools in the urban Cape Town Metropolitan area based on a complete list of all primary, intermediate and secondary schools. English questionnaires were used in Nigeria and South Africa and were translated and back translated into Kiswahili in Tanzania, Luganda and Runyakitara in Uganda and Afrikaans in South Africa. At each site, the study population was selected to facilitate accessibility and long-term follow-up as well as to ensure a spectrum of individuals from rural and urban locations with diverse occupations.

As part of the baseline questionnaire, we asked participants about injuries, as defined by WHO, in the past 12 months including frequency, severity, type, cause and treatment.[2] These questions were repeated at follow-up, where participants were asked about injuries in the past 6 months since taking the baseline questionnaire. Serious injury was defined as an event that prevented normal activities for at least 1 day, and disability from injury was defined as an event that resulted in physical impairment, such as difficulty using one's hand or arm or walking with a limp. Persons who indicated they experienced an injury were then prompted to indicate the cause of their most serious injury, selecting from transportation-related, sharp instrument, blunt instrument, hitting, gun, animal bite, poisoning/drug overdose, fall or other. Sharp instrument injuries included those inflicted by a knife or machete. Participants were also asked where they sought medical treatment for their injury, selecting from hospital admission, physician consultation, traditional healer, home remedy, none or other. Participants indicated whether their injury was intentional, non-intentional or self-inflicted. Intentional injury was defined as an injury resulting from purposeful action, and non-intentional injury was defined as an accidental injury. If the injury was purposeful and done towards oneself, it was defined as self-inflicted. Information was also collected on whether participants had experienced intimate partner violence, defined as being slapped, hit, choked, kicked or physically hurt by a spouse or sexual partner. Intimate partner violence was not included as a cause of serious injury and was not further defined as intentional or non-intentional. Above moderate alcohol consumption was defined as greater than two drinks per day for a male and greater than one drink per day for a female.

Statistical analysis

The study population included persons who answered questions on injuries in the baseline questionnaire, 93.0% (1316/1415) of PaCT participants. In urban and rural Uganda, 100.0% (297/297; 200/200) of participants answered questions on injuries, 92% (184/200) responded in Nigeria, 91.6% (448/489) responded in South Africa and the response rate was 81.7% (187/229) in Tanzania. Among those who answered the baseline questionnaire on injuries, 68.7% (904/1316) answered the follow-up questionnaire. The response rate was 84.5% (252/297) in urban Uganda, 93.5% (187/200) in rural Uganda, 95.1% (175/184) in Nigeria, 42.9% (192/448) in South Africa and 52.4% (98/187) in Tanzania.

Frequencies were calculated, and multivariable logistic regressions adjusted for age and sex were used to assess the independent association of different risk factors for injury. The data were checked for implausible values and outliers, and none were noted. Statistical analysis was performed using SAS V.9.3 software.

Ethical clearance and informed consent

At all sites, informed consent from each subject was acquired either through a signed form mailed back with a completed questionnaire (South Africa and Tanzania) or through documentation with trained interviewers (Nigeria and Uganda). Trained interviewers took informed consent verbally if the participant was illiterate.

This study was approved by the Harvard School of Public Health Institutional Review Board; the Institute of Human Virology Health Research Ethics Committee, Nigeria; the Health Research Ethics Committee of the Faculty of Health Sciences, Stellenbosch University; Makerere University School of Public

Table 1 Baseline characteristics by sex

	Female	Male	Total
Characteristic	**n=846**	**n=470**	**n=1316**
Age, years (n (%))			
18–24	59 (7.0)	40 (8.5)	99 (7.5)
25–34	153 (18.1)	132 (28.1)	285 (21.7)
35–44	250 (29.6)	125 (26.6)	375 (28.5)
45–54	237 (28.0)	95 (20.2)	332 (25.2)
55+	63 (7.5)	52 (11.1)	115 (8.7)
Missing	84 (9.9)	26 (5.5)	110 (8.4)
Education (n (%))			
No formal education	35 (4.1)	18 (3.8)	53 (4.0)
1–6 years	116 (13.7)	121 (25.7)	237 (18.0)
7–11 years	65 (7.7)	42 (8.9)	107 (8.1)
12+ (no college)	96 (11.3)	57 (12.1)	153 (11.6)
College degree(s)	491 (58.0)	210 (44.7)	701 (53.2)
Other	20 (2.4)	19 (4.0)	39 (3.0)
Missing	24 (2.8)	3 (0.6)	27 (2.1)
Location (n (%))			
Rural	100 (11.8)	100 (21.3)	200 (15.2)
Urban	746 (88.2)	370 (78.7)	1116 (84.8)
Marital status (n (%))			
Single	141 (30.0)	338 (40.0)	479 (36.4)
Married	291 (61.9)	376 (44.4)	667 (50.7)
Widowed/divorced	32 (6.8)	117 (13.8)	149 (11.3)
Other	2 (0.4)	4 (0.5)	6 (0.5)
Missing	4 (0.9)	11 (1.3)	15 (1.1)

Health Higher Degrees Research and Ethics Committee; National Institute for Medical Research, Tanzania; Mbarara University of Science and Technology Research Ethics Committee; and the Uganda National Council of Science and Technology.

RESULTS

Baseline characteristics of the study population are presented in table 1. A total of 1316 participants responded to questions on injuries at baseline; 847 were female (64.3%) and 470 (35.7%) were male. The median age of the participants was 41.2±11.2 years (range, 18–80 years). Over half of the study population had a college degree and 4.0% had no formal education. Eighty-five per cent of respondents were from urban settings. Sixty-two per cent of the females were married compared with 44% of males.

Causes of serious injury at baseline by site

Information on the most common causes of injury at baseline is presented in table 2. A total of 233 (17.7%) persons reported that they sustained a serious injury in the 12 months preceding the survey. The prevalence of injury ranged from 12.0% in rural Uganda to 28.3% in Nigeria. The most common cause of serious injury was transport related (19.3%), followed by sharp instruments (9.9%) and poison/drug overdose (7.3%). Transport-related injuries were the leading cause of injury in urban Uganda (46.7%) and Nigeria (19.2%). Burns were the leading cause of injury in Tanzania (11.9%), poison/drug overdose in South Africa (22.9%) and sharp instruments in rural Uganda (50.0%). Sixty-one per cent of injuries were non-intentional, 7.7% were self-inflicted and 2.6% intentional. Half of the respondents reported that they sought medical help for their injury. A total of 5.5% of the study population sustained a disability from their injury, and this ranged from 2.0% in rural Uganda to 9.0% in Tanzania. Among the four sites that reported on intimate partner violence, 4.4% of participants reported an injury inflicted by their partner or spouse.

Risk factors for serious injury at baseline

Risk factors for injury at baseline are presented in table 3. Participants who had a college education were more likely to have a serious injury compared with those with no formal education (OR: 4.67, 95% CI 1.43 to 15.28). Living at an urban site was associated with an increased odds for serious injury compared with those at the rural site (OR: 1.83, 95% CI 1.15 to 2.90). Persons who consumed above moderate amounts of alcohol were also more likely to be seriously injured compared with those who consumed less than moderate amounts of alcohol (OR: 1.86, 95% CI 1.02 to 3.41).

Distribution of safety practices at baseline

The distribution of safety practices at baseline is presented in table 4. Overall, 37.9% of participants reported that they do not feel safe walking in their neighbourhood at night. Persons in Tanzania were least likely to not feel safe (10.7%), while persons in urban Uganda were the most likely to not feel safe (49.5%). A small portion of participants reported having a working firearm in their home (7.1%). Half of participants reported that they seldom or never wore a helmet on a motorcycle though this

Table 2 Cause and treatment of most serious injury at baseline by site

	Urban Uganda	Rural Uganda	Nigeria	South Africa	Tanzania	Total
Characteristic	**n=297**	**n=200**	**n=184**	**n=448**	**n=187**	**n=1316**
Serious injury (n (%))	45 (15.2)	24 (12.0)	52 (28.3)	70 (15.6)	42 (22.5)	233 (17.7)
Cause of most serious injury* (n (%))						
Transport related	21 (46.7)	8 (33.3)	10 (19.2)	6 (8.6)	0 (0.0)	45 (19.3)
Sharp instrument (knife)	6 (13.3)	12 (50.0)	2 (3.8)	1 (1.4)	2 (4.8)	23 (9.9)
Poison/drug overdose	0 (0.0)	0 (0.0)	1 (1.9)	16 (22.9)	0 (0.0)	17 (7.3)
Burn	4 (8.9)	0 (0.0)	2 (3.8)	0 (0.0)	5 (11.6)	11 (4.7)
Human fists/hands	4 (8.9)	0 (0.0)	2 (3.8)	1 (1.4)	1 (2.4)	8 (3.4)
Blunt instrument (club)	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.4)	4 (9.5)	5 (2.1)
Fall	3 (6.7)	1 (4.2)	1 (1.9)	1 (1.4)	1 (2.4)	7 (3.0)
Animal bite	0 (0.0)	1 (4.2)	6 (11.5)	0 (0.0)	0 (0.0)	7 (3.0)
Firearm	0 (0.0)	0 (0.0)	5 (9.6)	0 (0.0)	0 (0.0)	5 (2.1)
Other	1 (2.2)	2 (8.3)	6 (11.5)	23 (32.9)	6 (14.3)	38 (16.3)
Missing	6 (13.3)	0 (0.0)	17 (32.7)	21 (30.0)	23 (54.8)	67 (28.8)
Type of injury* (n (%))						
Non-intentional	35 (77.8)	23 (95.8)	32 (61.5)	52 (74.3)	0 (0.0)	142 (60.9)
Intentional	3 (6.7)	0 (0.0)	0 (0.0)	1 (1.4)	2 (4.8)	6 (2.6)
Self-inflicted	0 (0.0)	1 (4.2)	2 (3.8)	4 (5.7)	11 (26.2)	18 (7.7)
Missing	7 (15.6)	0 (0.0)	18 (34.6)	13 (18.6)	29 (69.0)	67 (28.7)
Injury treatment* (n (%))						
Sought medical help	31 (68.9)	15 (62.5)	15 (28.8)	46 (65.7)	9 (21.4)	116 (49.8)
Traditional healer	1 (2.2)	4 (16.7)	0 (0.0)	0 (0.0)	6 (14.3)	11 (4.7)
Home remedy	2 (4.4)	4 (16.7)	0 (0.0)	3 (4.3)	0 (0.0)	9 (3.9)
No treatment sought	3 (6.7)	0 (0.0)	4 (7.7)	2 (2.9)	0 (0.0)	9 (3.9)
Missing	8 (17.8)	1 (4.2)	33 (63.5)	19 (27.1)	27 (64.3)	88 (37.8)
Disability from most serious injury	14 (4.7)	4 (2.0)	9 (4.9)	29 (6.5)	17 (9.1)	73 (5.6)
Injury from intimate partner violence	15 (5.1)	16 (8.0)	10 (5.4)	17 (3.8)	–	58 (4.4)

*Among persons who experienced a serious injury at baseline.

ranged from 8.9% in South Africa to 95.5% in rural Uganda. Overall, 38.3% of respondents reported that they seldom or never wore a seatbelt though this varied greatly by site. Participants from Nigeria and South Africa were least likely to never wear seatbelts (1.1% and 4.9%), while participants in rural and urban Uganda rarely wore seatbelts (94.0% and 76.4%). Drinking more than a moderate amount of alcohol was common in Nigeria (26.6%).

Causes of serious injury at follow-up by site

Information on the most common causes of injury at follow-up is presented in table 5. Sixty-nine per cent (904/1316) of participants answered the follow-up questionnaire. Six months after taking the baseline questionnaire, 6.6% (60/904) of participants reported a serious injury. Nigeria had the lowest incidence of injury (0.6%) and Tanzania has the highest incidence of injury (16.3%). The most common cause of injury was from a sharp instrument (15.0%), followed by transport related (11.7%) and poison/overdose (10.0%). Sixty-two per cent of injuries were non-intentional, 1.7% were self-inflicted and 3.3% intentional. Over half of the respondents reported that they sought medical help for their injury. A total of 1.8% of the study population sustained a disability from their injury. Among the four sites that reported on intimate partner violence, 0.8% of participants reported an injury inflicted by their partner or spouse.

Table 3 Multivariable logistic regression for factors associated with serious injury at baseline

	Unadjusted OR	Adjusted OR*
Risk factor	**(95% CI)**	**(95% CI)**
Sex		
Male	1.00	–
Female	0.96 (0.72 to 1.29)	–
Age, years		
18–24	1.00	–
25–34	2.09 (1.12 to 3.91)	–
35–44	1.09 (0.58 to 2.05)	–
45–54	1.23 (0.65 to 2.32)	–
55+	0.98 (0.45 to 2.13)	–
Education		
No formal education	1.00	1.00
1–6 years	3.49 (1.04 to 11.72)	3.32 (0.98 to11.22)
7–11 years	2.51 (0.69 to 9.15)	2.37 (0.64 to 8.72)
12+ (no college)	1.95 (0.54 to 6.97)	2.03 (0.56 to 7.32)
College degree(s)	4.58 (1.41 to 14.87)	4.67 (1.43 to 15.28)
Other	3.65 (0.88 to 15.14)	3.89 (0.92 to 16.47)
Location		
Rural	1.00	1.00
Urban	1.69 (1.08 to 2.66)	1.83 (1.15 to 2.90)
Felt safe walking in neighbourhood at night		
Agree	1.00	1.00
Sometimes	1.18 (0.75 to 1.88)	1.21 (0.76 to 1.93)
Disagree	1.08 (0.79 to 1.47)	1.09 (0.80 to 1.51)
Missing	0.47 (0.24 to 0.93)	0.50 (0.25 to 1.00)
Working firearms in home		
No	1.00	1.00
Yes	0.69 (0.37 1.29)	0.69 (0.37, to 1.30)
Helmet use		
Nearly always	1.00	1.00
Sometimes	1.96 (0.95to 4.07)	1.76 (0.84to 1.69)
Seldom/never	0.71 (0.44 to 1.17)	0.66 (0.40to 1.10)
Seatbelt use		
Nearly always	1.00	1.00
Sometimes	1.32 (0.87 to 2.00)	1.28 (0.84to 1.95)
Seldom/never	0.75 (0.54 to 1.04)	0.70 (0.50to 0.99)
Alcohol consumption†		
No	1.00	1.00
Yes	1.92 (1.06 to 3.50)	1.86 (1.02 to 3.41)

*Adjusted for sex and age.
†Defined as >1 drink/day for women and >2 drinks for men.

DISCUSSION

This study adds to the existing evidence on the vulnerability to injury among persons living in sub-Saharan Africa.[8] The prevalence of serious injury in the past year exceeded 12% at all sites, and the incidence of injury in the past 6 months was 6.6%. At baseline and follow-up, the three leading causes of serious injury were transport related, sharp instrument and poison/overdose. The majority of injuries were non-intentional, and treatment was sought at a medical facility. There was some variability between sites with respect to cause for injury.

Transport-related injuries were one of the most common causes of injury at all sites at baseline and follow-up, except in Tanzania. This is consistent with other studies in Africa, which have reported a particularly high prevalence of traffic-related injury in urban areas.[9–12] Previous studies from Africa have reported pedestrians and cyclist as groups most vulnerable to traffic-related morbidity and mortality, though our study did not identify the circumstances leading to the injury.[4 9 12] In rural Uganda, we found that traffic-related injuries were the second leading cause of injury which is in contrast with other studies, which found a lower risk of traffic-related injuries in rural settings compared with other types of injuries.[9 10 13 14] An increase in mobility related to agricultural production and motorcycle usage could be contributing to an increasing burden of traffic-related injuries in rural communities.[9 15] Notably, the study participants in Tanzania reported no traffic-related injuries. Nearly half of respondents who reported an injury in Tanzania did not identify the cause of the injury at baseline.

Poor compliance with traffic-related safety practices was evidenced in this study by the low prevalence of seatbelt and helmet use. Low seatbelt use was most prominent at both sites in Uganda compared with South Africa and Nigeria. Seatbelt use by all vehicle passengers is mandatory in South Africa and Nigeria, which could reflect the impact that laws can have on improving traffic-related safety practices.[3] Socioeconomic status may also be an important predictor of seatbelt use; South Africa and Nigeria have higher gross domestic product (GDP)than Uganda and Tanzania, and in our study, those from Nigeria and South Africa had higher educational attainment than those from Uganda.[16 17] The prevalence of helmet use was lower than reported in other studies in Uganda and Ghana.[18 19] Motorcycle use is becoming an increasingly important form of mobility in both urban and rural Africa, and given the predicted rise in transport-related injuries, the low prevalence of helmet use is particularly concerning.[15 18] Currently, only South Africa and Nigeria have mandatory helmet laws, though differing levels of enforcement may impact adherence.[3] None of the countries included in this study have funded national strategies that set specific targets for reducing road-related death and injury.

Given the high burden of RTIs, governments should prioritise road safety on the public health agenda. Multisectorial

Table 4 Distribution of safety practices at baseline by site

	Urban Uganda	Rural Uganda	Nigeria	South Africa	Tanzania	Total
Risk factor	**n=297**	**n=200**	**n=184**	**n=448**	**n=187**	**n=1316**
Felt safe walking in neighbourhood at night (n (%))						
Disagree	147 (49.5)	76 (38.0)	66 (35.9)	190 (42.4)	20 (10.7)	499 (37.9)
Working firearms in home	23 (7.7)	0 (0.0)	5 (2.7)	43 (9.6)	22 (11.8)	93 (7.1)
Helmetuse(n (%))						
Seldom/never	244 (82.2)	191 (95.5)	100 (54.4)	40 (8.9)	88 (47.1)	663 (50.4)
Seatbelt use (n (%))						
Seldom/never	227 (76.4)	188 (94.0)	2 (1.1)	22 (4.9)	65 (34.8)	504 (38.3)
Alcohol consumption* (n (%))	0 (0.0)	6 (3.0)	49 (26.6)	0 (0.0)	1 (0.5)	56 (4.3)

*Defined as >1 drink/day for women and >2 drinks for men.

governmental intervention strategies should focus on curtailing risk factors for traffic accidents, which include high speed, drink-driving, low use of seatbelts and helmets and distracted driving.[20] Indeed, research has shown that wearing a seat belt reduces the risk of a fatality among front-seat passengers by 40%–50% and wearing a motorcycle helmet can reduce the risk of severe injury by over 70%.[20] National strategies with specific targets aimed at increasing seatbelt and helmet use and establishing prohibitive drink-driving laws and checkpoints should be implemented, as evidence suggests that when such laws are enforced, they are effective.[20] Improved data collection systems in the health and police sector are essential to improving road safety.[20]

Sharp instruments injuries were the most common cause of injury in the rural area at both baseline and follow-up. A high prevalence of sharp instrument injury in rural African communities has been reported in other studies and is likely a reflection of the agriculturally based livelihoods of the population.[9 10 15 21] The use of axes and machetes for farming makes rural dwellers more vulnerable to sharp instrument injuries.[9 22] Prevention strategies should advocate for adapting traditional practices to reduce sharp instrument injuries in rural populations.[23]

Poison/overdose was the leading cause of injury in South Africa at both baseline and follow-up, though it was rare at all other sites. This discrepancy is expected, as studies indicate that South Africa's injury profile is different than that of other sites.[11 24–26] While this study did not collect information on the circumstances of the poisoning/overdose event, a hospital-based study in South Africa found that household chemicals and modern medicines were the leading cause of poisoning or overdose admissions.[27] Passive injury prevention approaches, in which

Table 5 Cause and treatment of most serious injury at follow-up by site

	Urban Uganda	Rural Uganda	Nigeria	South Africa	Tanzania	Total
Characteristic	**n=252**	**n=187**	**n=175**	**n=192**	**n=98**	**n=904**
Serious injury (n (%))	9 (3.4)	14 (7.5)	1 (0.57)	20 (10.4)	16 (16.3)	60 (6.6)
Cause of most serious injury* (n (%))						
Transport related	1 (11.1)	1 (7.1)	1 (100.0)	4 (20.0)	–	7 (11.7)
Sharp instrument (knife)	2 (22.2)	7 (50.0)	0 (0.0)	0 (0.0)	–	9 (15.0)
Poison/drug overdose	0 (0.0)	1 (7.1)	0 (0.0)	5 (10.0)	–	6 (10.0)
Fall	0 (0.0)	2 (14.3)	0 (0.0)	0 (0.0)	–	2 (3.3)
Blunt instrument (club)	0 (0.0)	1 (7.1)	0 (0.0)	0 (0.0)	–	1 (1.7)
Human fists/hands	1 (11.1)	0 (0.0)	0 (0.0)	0 (0.0)	–	1 (1.7)
Other	5 (55.6)	2 (28.6)	0 (0.0)	4 (20.0)	–	11 (18.3)
Missing	0 (0.0)	1 (7.1)	0 (0.0)	7 (35.0)	16 (100.0)	24 (40.0)
Type of injury* (n (%))						
Non-intentional	6 (66.7)	14 (100.0)	–	17 (85.0)	–	37 (61.7)
Intentional	2 (22.2)	0 (0.0)	–	0 (0.0)	–	2 (3.3)
Self-inflicted	0 (0.0)	0 (0.0)	–	1 (0.5)	–	1 (1.7)
Missing	1 (11.1)	0 (0.0)	1 (100.)	2 (10.0)	16 (100.0)	20 (33.3)
Injury treatment* (n (%))						
Sought medical help	3 (33.3)	6 (42.9)	–	12 (60.0)	11 (68.8)	32 (53.3)
Traditional healer	0 (0.0)	4 (28.6)	–	0 (0.0)	0 (0.0)	4 (6.7)
Home remedy	1 (11.1)	3 (21.4)	–	2 (10.0)	1 (6.3)	7 (11.7)
No treatment sought	3 (33.3)	1 (7.1)	–	2 (10.0)	3 (18.8)	9 (15.0)
Other	1 (11.1)	0 (0.0)	–	2 (10.0)	0 (0.0)	3 (5.0)
Missing	1 (11.1)	0 (0.0)	1 (100.0)	2 (10.0)	1 (6.3)	5 (6.7)
Disability from most serious injury	3 (1.2)	3 (1.6)	–	8 (4.2)	3 (3.1)	17 (1.8)
Injury from intimate partner violence	0 (0.0)	5 (2.7)	0 (0.0)	2 (1.0)	–	7 (0.8)

*Among persons who experienced a serious injury at follow-up.

the public is protected through legislation and product change, should be leveraged, as these may be more effective than strategies that require people to actively change their behaviours and lifestyle.[23] This approach should focus on improving storage that limits accessibility to potentially harmful subtancesand include the development and enforcement of prescription requirements for both medicines and pesticides.[28] Programming and educational campaigns should focus on addressing the underlying societal factors that could be leading to self-harm, such as poverty, violence and trauma.[28] Increasing access to mental healthcare and reducing stigma about mental illness is essential for reducing self-harm by poisoning.[29]

While empirical evidence on intimate partner violence in sub-Saharan Africa is limited, existing evidence suggests it is a pervasive yet under prioritised problem.[30] Participants from rural Uganda reported the highest prevalence of injury from intimate partner violence at both baseline and follow-up. This finding is consistent with another study in rural Uganda.[31] We found that injury from intimate partner violence in South Africa was lower than has been reported,[32] perhaps due to the fact that the South African participants were all teachers. Indeed, studies have found that women with higher educational attainment and higher socioeconomic status are relatively protected from domestic violence.[32 33] In a multivariable analysis (not shown), sex, age, education, marital status and alcohol consumption were not associated with an increased risk for injury from intimate partner violence.

Persons who had consumed above moderate amounts of alcohol had an almost twofold increased risk of serious injury. Alcohol has been cited as a major contributor for many injury types in Africa, including road traffic accidents and violence.[1 11 34 35] We found that most people who drank above moderate amounts of alcohol had a college education. One possible explanation for this is that in emerging economies, persons with higher income are more likely to engage in recreational drinking activities, and it is plausible that those with higher educational attainment also have higher income. Participants who lived in an urban area were 1.8 times more likely to be injured compared with those in the rural area. Other community-based studies have found a higher risk of injury among rural populations or similar prevalence between urban and rural populations.[9] In this study, the high prevalence of road-traffic injuries in the urban area is a major contributor to the cited increased risk. Education was also an important risk factor for injury. We found that persons with a college education were 4.7 times more likely to be injured compared with those with no formal education. , Persons with higher education are more likely to have access to cars and medication, putting them at an increased risk for transport-related injuries and poison/overdose injuries.

There are multiple strengths to this study. First, this study demonstrates the feasibility of disseminating a standardised survey instrument to diverse community populations spread throughout a continent. The study findings are longitudinal in nature, allowing the authors to comment on the burden of injury at two distinct time points. This study also serves as the foundation for a future cohort that aims to move away from the standard descriptive epidemiological approach, towards a longitudinal study design that can assess the complexities of injury in Africa.

Several limitations exist in this study. First, the number of injuries reported in this study was small. This limited our ability to assess details on injuries, such as risk factors associated with intimate partner violence. Because we only asked a limited number of questions, we cannot comment on the circumstances in which the injury occurred, such as the location of the injury or anatomical position affected. Some questions were subject to high proportions of missing data and should be interpreted with caution. Our study may also be subject to various biases related to relying on self-reported data. However, evidence from a study in Tanzania found that a recall period of 12 months does not affect estimates for severe injuries.[36] Lastly, our study populations were not representative samples of their country and do not represent all persons who experience non-fatal injury. Thus, generalisations may be limited. Indeed, we hypothesise that because our population is older, predominately female and more educated than the population at large, our prevalence estimates are likely conservative estimates of the true population prevalence.

CONCLUSION

Despite recognition of the growing burden of injuries in sub-Saharan Africa, little is known about the specific causes and risk factors for injuries in this region. Evidence from this study suggests that transport-related injuries contribute a sizeable portion of the burden of injury at both rural and urban sites. This is particularly concerning given the relatively limited use of seatbelts, helmets and limited traffic-related laws. Burns, sharp instrument injuries and poison/overdose are important contributors to the injury burden among this population. Injury from domestic violence is an important public health concern in SSA. Alcohol consumption, urban location and high education are important risk factors for injury. There is a need for larger, community-based studies on injuries in order to assess risk factors specific to persons in sub-Saharan Africa. Longitudinal data are essential for identifying risk factors for injury in SSA. These data could be leveraged to develop targeted interventions that decrease disability and mortality in the future.[7]

What is already known on this subject

- Injury-related morbidity is rapidly increasing worldwide despite being viewed as largely preventable.
- Compared with high-income countries, low-income and middle-income countries (LMIC) experience a disproportionally greater burden of disability due to injury.
- Most injury data are in sub-Saharan Africa collected from hospital-based studies and police data.

What this study adds

- Evidence from this study suggests that transport-related events, sharp instrument injury and poison/overdose are important contributors to the burden of injury among our study population.
- Alcohol consumption, urban location and high education are important risk factors for injury.
- This study demonstrates the feasibility of disseminating a standardised survey instrument to diverse community populations spread throughout a continent at two time points.

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Prevalence and risk factor for injury in sub-Saharan Africa: a multicountry study

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