The Inter-Relationship Between Employment Status and Interpersonal Violence in Malawi: A Trauma Center Experience

Laura N. Purcell[1] · Linda Kayange[2] · Jared Gallaher[1] · Carlos Varela[2] · Anthony Charles[1,2]

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Abstract

Introduction As a proportion of the overall population, sub-Saharan Africa (SSA) has the highest youth demographic, composing 60% of Africa's unemployed. With the worsening economic crisis in low- and middle-income countries, unengaged youth are susceptible to gang violence and anti-government demonstrations, resulting in political instability.

Methods We performed a retrospective review of the Kamuzu Central Hospital Trauma Registry from 2008–2018. All adult patients (>14 years) injured by interpersonal violence (IPV) were included. Age was categorized as 15–24 (youth), 25–45, and >45 years. A bivariate analysis (IPV versus unintentional injury), and Poisson multivariable analysis were performed to identify factors increasing the risk of IPV.

Results During the study, 87,338 trauma patients presented; 30,532 (35.0%) were injured following IPV. Patients injured following IPV (28 years, IQR 23–34) were younger than those unintentionally injured (30 years, IQR 23–39, $p < 0.001$). More patients injured following IPV were unemployed (n = 7,178, 23.6% vs. n = 10,148, 17.9%, $p < 0.001$), injured at night (n = 19,346, 63.7% vs. n = 10,148, 17.9%, $p < 0.001$), and reported alcohol use (n = 4.973, 16.4% vs n = 2,461, 4.4%, $p < 0.001$). Being unemployed (RR 1.25, 95% CI 1.22–1.27), youth compared to age >45 years (RR 1.72, 1.66–1.79), and those injured at night (RR 2.18, 95% CI 2.14–2.23) had increased the risk of being victims of IPV.

Conclusion In Malawi, there is an interrelationship between unemployment and IPV, particularly in the youth population. Given impending demographic realities, government and non-government organizations should prioritize youth employment to help defer political instability in vulnerable nation-states.

Introduction

Interpersonal violence is common in all societies. The World Health Organization (WHO) and the World Health Assembly have proclaimed it as a global health priority, as well as a leading human rights and social issue [1, 2]. According to the WHO, approximately 1.6 million people die yearly as a result of violence. Of these deaths, an astonishing 91% are attributed to low- to middle-income countries (LMIC), with the remaining occurring in high-income countries (HIC) [3]. Interpersonal violence (IPV) is defined by the WHO as "the intentional use of physical

Anthony Charles
anthchar@med.unc.edu

[1] Department of Surgery, UNC School of Medicine, University of North Carolina At Chapel Hill, 4008 Burnett Womack Building, Chapel Hill CB 7228, USA

[2] Department of Surgery, Kamuzu Central Hospital, Lilongwe, Malawi

force or power, threatened or actual, against a person or group that results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment, or deprivation [4]."

In 2020, IPV remains a leading cause of premature death in sub-Saharan Africa. The costs due to interpersonal violence are high and estimated to be as high as 14% of the gross national product of LMIC [5, 6]. These costs can be divided into direct and indirect costs, and the burden of these costs is shouldered by society. Direct costs included the cost of legal services, medical costs, policing and incarceration, and private security contracts. Indirect costs to victims include lost earnings, life insurance, and psychological costs. Society's indirect costs include lost investments in human capital, productivity loss, and a decrease in external investment and tourism [7].

Poverty is one of the structural drivers of violence, particularly among young people living in urban areas [8]. Of all global regions, Africa has the largest youth population in the world, with estimates as high as 200 million [9]. According to the World Bank, Africa's youth account for 60% of all its unemployed persons [10]. Youth unemployment is approximately double the unemployment rate of adults, with significant variation by country.

Malawi is a small country landlocked in southeast Africa. It is the fourth poorest country in the world, with a population of 18 million people and a per capita gross domestic product of $389 [11]. Its population's median age is 16.8 years, compared to 38.5 years in the USA, as shown in Fig. 1 [12]. Malawi can serve as a proxy for many countries in sub-Saharan Africa. We hypothesize that there is a positive correlation between being a victim of interpersonal violence and being unemployed. This study aims to characterize injury intent based on employment status and assess the independent effect of age and employment status in the risk of being a victim of interpersonal violence.

Methods

Utilizing the Kamuzu Central Hospital (KCH) Trauma Surveillance Registry, a retrospective analysis was performed. The registry includes all patients who present to KCH with a traumatic injury. In this study from February 2008 to May 2018, all assaulted adult patients $\geq$ 5 years were included, as youth is defined by the United Nations as persons between 15 and 24 years of age [13]. Patients were excluded if they had an alternative mechanism of traumatic injury or if age was missing in the registry.

KCH is a 900-bed tertiary hospital and trauma center located in Lilongwe, Malawi. Its catchment area is the central region of Malawi, which has a population of 7.5 million persons. KCH has a casualty department, 5-bed intensive care, and high-dependency units, and two surgical wards divided by sex. Clinical officers and first-year medical officers provide clinical care in the casualty. General surgery attendings, general surgery registrars, and clinical officers provide all surgical care.

In this study, the unemployed are defined as persons of working age who were: (a) without work at the time of presentation, nor working for themselves; (b) presently available for paid work.

Missing data and variable distribution were evaluated with descriptive analysis. Bivariate analysis was performed over a dichotomized mechanism of injury, assault, or unintentional injury. The central tendencies of normally distributed variables were described with means (standard deviations [SD]). Non-normally distributed variables' central tendency was described with a median (interquartile ranges [IQR]). To compare the central tendencies on bivariate analysis, ^{2} for categorical variables, Student's t test for normally distributed continuous variables, and Kruskal–Wallis for non-normally distributed continuous variables were used.

Multivariable Poisson regression modeling was utilized to determine patient factors that affect the relative risk of being a victim of assault. Patient age, sex, diurnal time of injury, and unemployment status were included in the regression a priori. If patient characteristics or demographics, which may influence the risk of assault, were not evenly distributed on bivariate analysis, defined as $p < 0.05$, they were included in the model. Victim alcohol use was included based on this criterion. To reduce model error, we performed a backward stepwise regression to obtain a reduced model. Based on p value, variables were removed in order to maintain precision (narrowing of confidence intervals) and reduce bias (<10% change in risk ratios). All covariates were significant, and therefore there were no covariates removed from the full model.

Poisson multivariable regression was performed to determine patient factors that affect the relative risk of being a female and male victim of an assault. Patient age, diurnal time of injury, and unemployment status were included in both regressions, a priori. The victim alcohol use was included in the full model base on the previously described criteria. A backward elimination approach, as described, was performed, with no removal of any covariates in either model, as all were statistically significant.

StataCorp v16.0, College Station, Texas, was utilized for this analysis. This study was approved by the University of North Carolina Institutional Review Board and the Malawi National Health Science Research Committee.

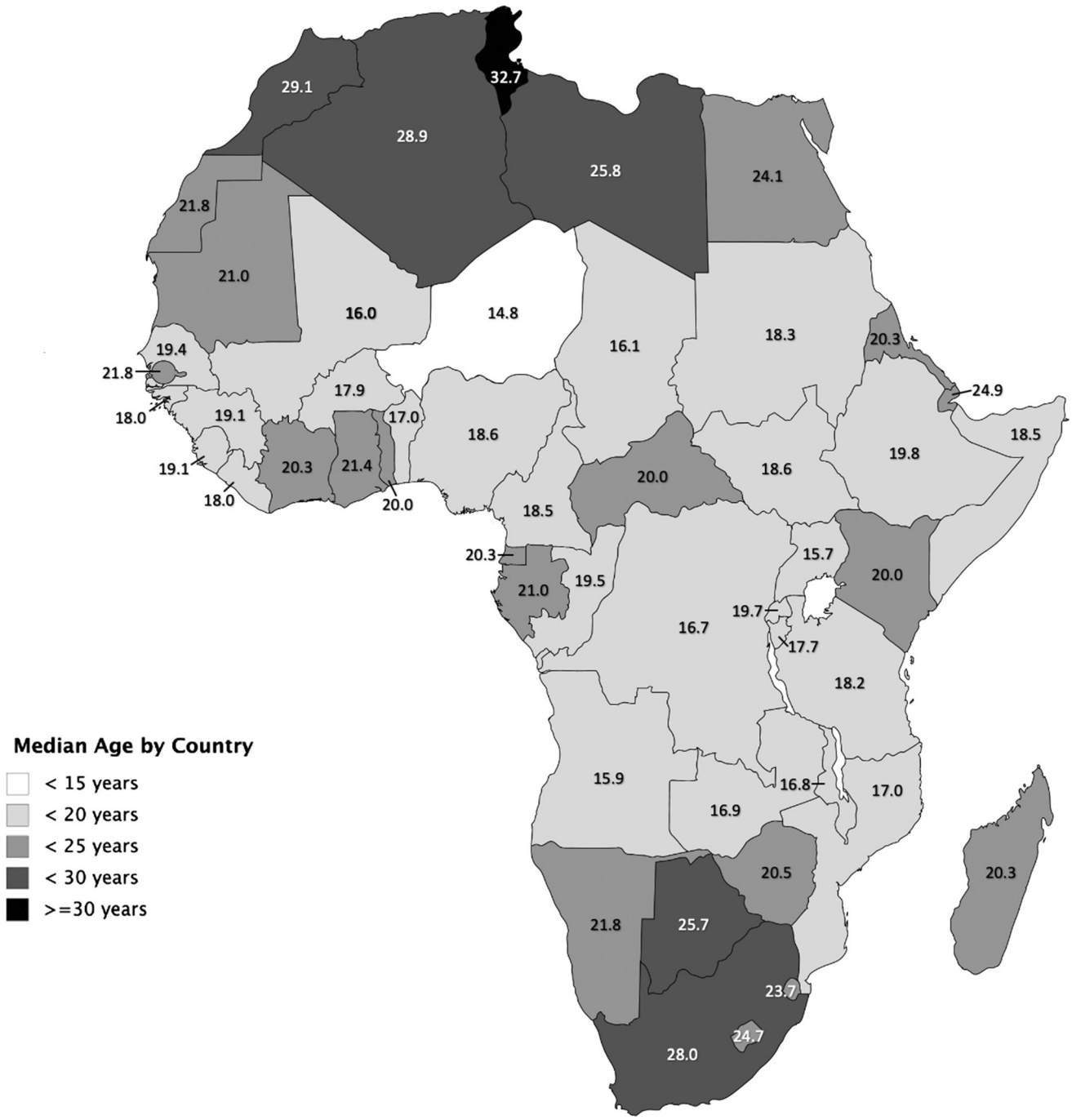

Fig. 1 Median Age of Population by Country. *Data Source*: https://www.cia.gov/library/publications/the-world-factbook/fields/343rank.html. *Map Source*: https://mapchart.net/africa.html

Results

During the study period, 131,020 patients presented to the KCH casualty with traumatic injuries. Of those, 88,858 (67.8%) were adults (≥ 15 years), and 87,338 (98.3%) had complete mechanism of injury data. In the overall cohort, 76.7% (n = 66,910) were male, 19.9% (n = 17,326) were unemployed, and 42.5% (n = 36,875) were injured at night. The median age was 29 years (IQR 23–37), as given in Table 1.

In the overall cohort, there were 56,815 (65.0%) and 30,523 (35.0%) unintentional injuries and assaults, respectively. The median age was higher in the unintentional injury (30 years, IQR 23–39) than the assault cohorts (28 years, IQR 23–34), respectively, $p < 0.001$. More patients were unemployed in the assault than the

Table 1 Demographics, characteristics and outcomes of trauma patients by intent

	Overall (n = 87,338)	Unintentional injury (n = 56,815, 65.0%)	Assault (n = 30,523, 35.0%)	p value
Male sex: n (%)	66,910 (76.7%)	42,472 (74.8)	24,438 (80.1)	<0.001
Age: median (IQR)	29 (23–37)	30 (23–39)	28 (23–34)	<0.001
Age: n (%)				<0.001
15–24 years	26,386 (30.2)	16,496 (29.0)	9,890 (32.4)	
25–45 years	50,218 (57.5)	31,722 (55.8)	18,496 (60.6)	
>45 years	10,734 (12.3)	8,597 (15.1)	2,137 (7.0)	
Unemployed: n (%)	17,326 (19.9)	10,148 (17.9)	7,178 (23.6)	<0.001
Night injury: n (%)	36,875 (42.5)	17,529 (31.0)	19,346 (63.7)	<0.001
Reported alcohol: n (%)	7,434 (8.6)	2,461 (4.4)	4,973 (16.4)	<0.001
Injury setting: n (%)				<0.001
Home	23,182 (27.1)	12,634 (22.6)	10,548 (35.3)	
Work	9,801 (11.4)	7,243 (13.0)	2,558 (8.6)	
Road	41,533 (48.5)	30,319 (54.3)	11,214 (37.6)	
Public space	5,425 (6.3)	1,562 (2.8)	3,863 (12.9)	
Other	5697 (6.7)	4,035 (7.2)	1,662 (5.6)	
Transport: n (%)				<0.001
Minibus	27,707 (32.1)	17,743 (31.6)	9,964 (33.0)	
Private vehicle	36,136 (41.9)	23,192 (41.3)	12,942 (42.9)	
Ambulance	9,317 (10.8)	7,201 (12.8)	2,116 (7.0)	
Police	5,240 (6.1)	2,217 (4.0)	3,023 (10.0)	
Other	7,913 (9.2)	5,759 (10.3)	2,154 (7.1)	
Transferred: n (%)	13,340 (15.3)	10,134 (17.9)	3,206 (10.5)	<0.001
Injury mechanism: n (%)				<0.001
Peds vs motor vehicle	5,326 (6.3)	5,297 (9.7)	29 (0.1)	
Motor vehicle collision	12,698 (14.9)	12,607 (23.1)	91 (0.3)	
Bike collision	8,456 (9.9)	8,406 (15.4)	50 (0.2)	
Gunshot wound	312 (0.4)	93 (0.2)	219 (0.7)	
Fall	14,267 (16.8)	14,168 (25.9)	99 (0.3)	
Burn	1,644 (1.9)	1,586 (2.9)	58 (0.2)	
Assault	29,817 (35.0)	0 (0.0)	29,817 (97.9)	
Hanging	96 (0.1)	94 (0.2)	2 (0.0)	
Other	12,532 (14.7)	12,430 (22.7)	102 (0.3)	
Injury type: n (%)				<0.001
Contusion	28,998 (33.4)	19,403 (34.4)	9,595 (31.6)	
Laceration	21,815 (25.2)	9,448 (16.8)	12,367 (40.8)	
Fracture	11,062 (12.8)	9,290 (16.5)	1,772 (5.8)	
Burn	1,473 (1.7)	1,401 (2.5)	72 (0.2)	
Penetrating wound	3,082 (3.6)	899 (1.6)	2,183 (7.2)	
Gunshot wound	281 (0.3)	88 (0.2)	193 (0.6)	
Injury to internal organ	1,071 (1.2)	733 (1.3)	338 (1.1)	
Head Injury	3,934 (4.5)	2,614 (4.6)	1,320 (4.4)	
Other	15,005 (17.3)	12,510 (22.2)	2,495 (8.2)	
Injury location: n (%)				<0.001
Head/C-spine	34,732 (40.1)	15,757 (28.0)	18,975 (62.7)	
Chest	5,253 (6.1)	3,278 (5.8)	1,975 (6.5)	
Abdomen/pelvis	4,321 (5.0)	3,030 (5.4)	1,291 (4.3)	
Extremity	42,008 (48.5)	34,054 (60.5)	7,954 (26.3)	
Other	274 (0.3)	193 (0.3)	81 (0.3)	

Table 1 continued

	Overall (n = 87,338)	Unintentional injury (n = 56,815, 65.0%)	Assault (n = 30,523, 35.0%)	p value
Admission dispo: n (%)				<0.001
OPD	70,857 (81.5)	45,059 (79.7)	25,798 (84.9)	
Admitted to ward	13,930 (16.0)	9,921 (17.5)	4,009 (13.2)	
Admitted to HDU	448 (0.5)	335 (0.6)	113 (0.4)	
Admitted to ICU	322 (0.4)	260 (0.5)	62 (0.2)	
Died in casualty	306 (0.4)	216 (0.4)	90 (0.3)	
Brought in dead	1,081 (1.2)	766 (1.4)	315 (1.0)	
All mortality: n (%)	2,753 (2.1)	2,176 (2.3)	577 (1.7)	< 0.001
In-hospital mortality: n (%)	841 (1.0)	653 (1.2)	188 (0.6)	< 0.001

unintentional injury cohort (n = 7,178, 23.6% vs. n = 10,148, 17.9%, $p < 0.001$). The majority of assaults occurred at night (n = 19,346, 63.7%) in contrast to the minority of unintentional injuries (n = 17,529, 31.0%), $p < 0.001$. Patients presenting with assault were more likely to have reported alcohol use (n = 4,973, 16.4%) than their unintentional injury counterparts (n = 2,461, 4.4%), $p < 0.001$. The primary injury setting was on the road for both assault (n = 30,319, 54.3%) and unintentional injury (n = 11,214, 37.6%) cohorts. Overall mortality was 1.7% (n = 577) and 2.3% (n = 2,176) for the assault and unintentional injury cohorts, respectively ($p < 0.001$), as given in Table 1.

In the Poisson multivariable regression identifying factors which affect the risk of being a victim of assault, male sex (RR 1.22, 95%CI 1.20–1.26), reported alcohol use (RR 1.60, 95%CI 1.57–1.63), and being unemployed (RR 1.25, 95%CI 1.22–1.27) increase the relative risk of being a victim of an assault. Victims in the youth age category (RR 1.72, 95%CI 1.66–1.79) and those 25–45 years (RR 1.63, 95%CI 1.56–1.69) had an increased relative risk of being a victim of assault when compared to patients >45 years, as given in Table 2.

In the Poisson multivariable regression identifying factors which affect the risk of a woman being a victim of assault, being unemployed (RR 1.34, 95%CI 1.29–1.39), injured at night (RR 2.05, 95%CI 1.97–2.14), and reported victim alcohol use (RR 1.82, 95%CI 1.73–1.91) increased the relative risk of being an assault victim. Female victims in the youth age category (RR 2.73, 95%CI 2.47–3.01) and those 25–45 years (RR 2.40, 95%CI 2.17–2.64) had an increased relative risk of being a victim of assault when compared to women >45 years, as given in Table 3.

In the Poisson multivariable regression identifying factors which affect the risk of men being a victim of assault, being unemployed (RR 1.22, 95%CI 1.19–1.25), injured at night (RR 2.21, 95% CI 2.16–2.26, $p < 0.001$), $p < 0.001$), and reported victim alcohol use (RR 1.57, 95% CI 1.53–1.61) increased the relative risk of being an assault victim. Male victims in the youth age category (RR 1.53, 95%CI 1.46–1.59) and those 25–45 years (RR 1.47, 95% CI 1.41–1.53) had an increased relative risk of being a

Table 2 Poisson multivariate analysis of risk of being a victim of inter-personal violence

	Risk ratio	95% confidence interval	P value
Male sex	1.22	1.20–1.26	<0.001
Age			
15–24 years	1.72	1.66–1.79	<0.001
25–45 years	1.63	1.56–1.69	<0.001
>45 years	Ref	–	–
Reported victim alcohol	1.60	1.57–1.63	<0.001
Injured at night	2.18	2.14–2.23	<0.001
Unemployed	1.25	1.22–1.27	<0.001

Table 3 Poisson multivariate analysis of risk of women being a victim of assault

	Risk ratio	95% confidence interval	*P* value
Age			
15–24 years	2.73	2.47–3.01	<0.001
25–45 years	2.40	2.17–2.64	<0.001
>45 years	Ref	–	–
Reported victim alcohol	1.82	1.73–1.91	<0.001
Injured at night	2.05	1.97–2.14	<0.001
Unemployed	1.34	1.29–1.39	<0.001

victim of assault when compared to women >45 years, as given in Table 4.

Discussion

IPV involves the intentional use of physical force or power against other persons by an individual or small group of individuals. In this study of patients presenting to a trauma center in Lilongwe, Malawi, we show a clear interrelationship between IPV and the employment status of the victim of IPV. We show after controlling for pertinent covariates, the relative risk of being a victim IPV is 25% higher if the victim is unemployed than if employed. Being male increased the risk of IPV by 22%. Also, the most common age category for assault was in the youth (ages 15–24) in both sexes. All other previously reported risk factors for interpersonal violence, such as time of day and alcohol intoxication, were also found in this study.

According to the International Labor Organization (ILO), unemployment for the youth in Malawi is at 40.5%, with an overall 5.6% unemployment as of 2017. Some countries in the region have higher youth unemployment rates at 18.5% and 15.9% for Kenya and Zambia, respectively. Kenya and Zambia's overall unemployment are 9.3 and 7.1%, respectively [14].

These figures do not reveal the significant proportion of individuals who are vulnerably employed, those who are self-employed or are employed by family members [15]. The majority of youth in Africa do not have stable economic opportunities. Approximately one-third of Africa's 420 million youth are unemployed, and another third are vulnerably employed. When compared to adults, youth face roughly double the unemployment, with significant variation by country. Africa's youth unemployment has serious consequences. It leads to substandard living conditions, contributes to the continent's brain drain, and fuels political and social conflict [16].

The relationship between youth and violence is well established, particularly in males [17]. An association between unemployment and violence is widely assumed, but there is a paucity of definitive evidence to establish a causal link. There is a widespread belief that unemployment is associated with greater vulnerability to participation in armed violence, crime, and other illicit activities as the opportunity cost for violence is lower [18, 19]. Hence, unemployment is a risk factor of being a perpetrator of interpersonal violence. Until now, there is very little data showing that being unemployed places one at an increased risk of being a victim of interpersonal violence. Prior studies have shown that unemployed youth are more likely to be victims and perpetrators of crime and violence [20].

Table 4 Poisson multivariate analysis of risk of men being a victim of assault

	Risk ratio	95% confidence interval	*P* value
Age			
15–24 years	1.53	1.46–1.59	<0.001
25–45 years	1.47	1.41–1.53	<0.001
>45 years	Ref	–	–
Reported victim alcohol	1.57	1.53–1.61	<0.001
Injured at night	2.21	2.16–2.26	<0.001
Unemployed	1.22	1.19–1.25	<0.001

The environment and communities in which people reside will influence the type of people they associate with and the exposure to situations that may lead to violence. In sub-Saharan Africa, the unemployed typically reside in peri-urban slums such as Kibera in Nairobi, Kenya, or Makoko in Lagos, Nigeria [21, 22]. The combination of high levels of neighborhood crime, violence, and easy access to drugs, alcohol, and firearms breed both perpetrators and victims with similar socioeconomic traits. Within urban areas, those living in high crime neighborhoods are more likely to be involved in violent behavior [23].

We have previously shown that there is a female preponderance of in-home interpersonal violence in Malawi [24]. In the intimate partner violence literature, a relationship between employment status and being a victim of intimate partner violence has been established. Interestingly, male unemployment has been shown to decrease the incidence of intimate partner violence. In contrast, female unemployment tends to increase intimate partner violence, with women being the recipient of the violence [25, 26]. Our study shows unemployed women are at a higher risk of being a victim of interpersonal violence.

The relationship between unemployment and violence may also be mediated by other factors related to stress. Specifically, stressors, like unemployment and economic hardship and uncertainty, might lead to increased use of licit and illicit substances [27]. As people use mind-altering substances as a coping mechanism, particularly alcohol, it can, in turn, lead to the perpetration or being a victim of interpersonal violence [28]. In our study, the use of alcohol increases the risk of being a victim of interpersonal violence.

Any injury prevention strategy that is deployed in sub-Saharan Africa must include a pathway to attenuate the challenge of youth employment with formal employment opportunities to increase wage employment [16]. A key enabling action is to ensure that each cohort of youth entering the workforce has a solid skills foundation acquired through basic education. Interventions essential in youth employment development programs include vocational training, advanced education, entrepreneurship promotion, government policy to encourage youth employment, and engagement with the private sector and public works schemes [29]. A comprehensive approach to tackling this major challenge will address human capital and business environment constraints.

This study has some limitations. The patient's unemployment status is self-reported at the time of injury, and as a result, the duration of unemployment or the desire to seek employment is less certain. The association between alcohol use and trauma is also based on self-reporting, history of alcohol intake, or the smell of alcohol in the victim, as blood alcohol testing or alcohol breath test were not available. Lastly, there may have been some unaccounted covariates that we could not control for in this analysis.

Conclusion

In Malawi, there is an interrelationship between unemployment and IPV, particularly in the youth population and in both sexes. Given impending demographic realities, government and non-government organizations should prioritize youth employment to help defer political instability in vulnerable nation-states. Employment is an injury prevention strategy.

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