



# Risk Factors for Recurrent Injuries from Physical Violence Among African Men in The Gambia

Paul Bass<sup>1,2,4</sup> · Wen-Yu Yu<sup>1,3</sup> · Edrisa Sanyang<sup>5</sup> · Mau-Roung Lin<sup>1,2</sup>

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## Abstract

While men are known to be at high risk of recurrent injuries from physical violence, the risk factors in African men have not been investigated. We conducted a matched case-control study to identify factors associated with recurrent injuries from physical violence in The Gambia. Eligible participants were injured male patients aged  $\geq 15$  years. Over the 12-month study period, 257 cases with recurrent injuries from physical violence, and 257 control patients each from two control groups (violence controls and nonviolence controls) were recruited from eight emergency rooms located in six districts of the Greater Banjul Metropolitan Area, The Gambia. The two control groups matched cases at the same health facility, date of injury, and age, in which violence controls (VCs) experienced only one violence-related injury in the past 12 months and nonviolence controls (NCs) experienced no violence-related injuries. Results of the multivariable conditional logistic regression showed that for both the VC and NC groups, a polygamous family ( $OR_{VC}$ , 3.62;  $OR_{NC}$ , 2.79),  $> 8$  family members ( $OR_{VC}$ , 5.60;  $OR_{NC}$ , 4.81), being brought up by a family relative ( $OR_{VC}$ , 5.17;  $OR_{NC}$ , 2.11), having smoked cigarettes in the past week ( $OR_{VC}$ , 3.53;  $OR_{NC}$ , 4.03), and perceiving no family support ( $OR_{VC}$ , 1.12;  $OR_{NC}$ , 1.19) were significantly associated with the occurrence of recurrent violent injuries. Furthermore, compared to the NCs, three additional factors of  $> 2$  male siblings ( $OR_{NC}$ , 1.84), low household income ( $OR_{NC}$ , 3.11), and alcohol consumption in the past week ( $OR_{NC}$ , 4.66) were significantly associated with the occurrence of recurrent violent injuries. These findings may fill in a knowledge gap that will be beneficial for developing effective intervention programs to reduce recurrent injuries from physical violence among African men.

**Keywords** Emergency room · Men · Risk factors · Recurrent injuries · Physical violence

## Introduction

Violent injuries are important public health concerns in terms of their social impacts and substantial healthcare costs to society. In low- and middle-income countries, males account for more than 70% of patients injured due to physical violence treated in emergency rooms (ERs) with an estimated rate 2.5-fold higher than that of female counterparts [1, 2]. In sub-Saharan Africa, up to 78% of patients treated for physical violence are men [3, 4].

For individuals who survive an injury from physical violence, the likelihood of returning to the ER for a similar injury is high [5]. Up to 39% of trauma patients treated for violent injuries in the US returned to the ER for a similar injury [6, 7], among which 58% of black men reported a history of two or more hospitalizations for violent injuries [8]. Similarly, in the UK, 15% of injured patients had a subsequent ER visit due to domestic violence [9]. Often, victims of recurrent violent injuries face both short- and long-term

✉ Mau-Roung Lin  
mrlin@tmu.edu.tw

<sup>1</sup> Graduate Institute of Injury Prevention and Control, College of Public Health, Taipei Medical University, 250 Wu-Hsing Street, Taipei 11031, Taiwan

<sup>2</sup> School of Public Health, College of Public Health, Taipei Medical University, 250 Wu-Hsing Street, Taipei 11031, Taiwan

<sup>3</sup> Department of Emergency Medicine, Taipei Medical University Hospital, 250 Wu-Hsing Street, Taipei 11031, Taiwan

<sup>4</sup> Department of Public & Environmental Health, School of Medicine & Allied Health Sciences, University of The Gambia, Brikama, The Gambia

<sup>5</sup> Department of Public Health, College of Health and Human Services, Western Kentucky University, 1906 College Heights Blvd, Academic Complex 236E, Bowling Green, KY 42101, USA

health problems, such as depression, emotional distress, post-traumatic stress disorder, extended rehabilitation, prolonged recovery, and social and financial impacts [5, 7].

Risk factors for recurrent injuries from physical violence in African men have not previously been determined; however, identifying these risk factors can help develop effective interventions to prevent or reduce their incidence. According to studies in the UK and US, a number of sociodemographic and behavioral factors, such as young age, low educational status, unemployment, having witnessed violence, alcohol consumption, having older siblings, and having been a victim of childhood abuse, were significantly associated with the occurrence of recurrent violent injuries in men [7–10]. However, because of tremendous differences in environmental, behavioral, economic, and sociocultural factors, it is difficult to transfer these findings from developed countries to The Gambia or other African countries. For example, physical violence in African men is often reinforced by the dominant ideas of masculinity and sociocultural norms that highly support the use of physical violence either as a show of bravery or as a normal method of discipline [11, 12].

To address this key knowledge gap for physical violence prevention in African men, we conducted a matched case-control study, based on patients who visited an ER, to identify risk factors for recurrent injuries from physical violence among African men in The Gambia.

## Methods

### Study Participants

Over a 12-month study period from October 2016 to September 2017, potential participants who were male and aged  $\geq 15$  years were recruited from ERs of eight public health facilities located in six districts within the urbanized Greater Banjul Metropolitan Area. The Greater Banjul Area accounts for 60% of the country's population [13]. The eight health facilities of one hospital, two major health centers, and five minor health centers that represent different tiers (a hospital and major and minor health centers) of the health-care system in The Gambia were selected from 13 health facilities. These public health facilities provide health care for a broad range of conditions, including patients with all injury types. Private healthcare facilities were excluded because they do not offer 24-h ER services to all patients. We also excluded patients who visited the ER for late effects of a prior injury, who had difficulty communicating, or who could not provide written informed consent.

For this case-control design, cases were male patients aged  $\geq 15$  years who presented to an ER of the eight participating health facilities for an injury from physical violence at least twice over the 12-month period. An injury from

physical violence was defined as any injury or physical pain that had been intentionally inflicted by another person [14]. Two separate control groups of victims with violence-related and nonviolence-related injuries were used in the study. For each case, a violence control (VC) patient was selected from males aged  $\geq 15$  years who visited an ER due to a violent injury only once in the past 12 months, while a nonviolence control (NC) patient was also selected from those who visited the same ER due to an injury from a traffic crash, fall, sports, or other nonviolent injury cause. Both sets of control patients were matched by the health facility, date of injury, and age ( $\pm 2$  years) to an index case. Matching the health facility and date of injury was presumed to exclude potential confounding effects of geographical area and calendar time (weekday, weekend, and holiday). In addition, the use of VC patients was intended to exclude potential confounding of the violence dynamics such as the probability of recurrence. In total, 257 cases and 514 injured (257 VC and (257) NC patients were recruited.

This research was reviewed and approved by the University of The Gambia Research and Publication Committee and the Joint Gambia Government/Medical Research Council Ethics Committee on human subject research (R016-006). The Ministry of Health Social Welfare, The Gambia also granted approval to conduct the study at the participating health facilities. All participants provided written informed consent before participating in the study.

### Data Collection

All ER physicians and nurses who collected data for this study in each of the eight health facilities had received 8 h of training on the use of the structured questionnaire and how to consistently collect the same information from all participants. To ensure data quality, each study site was visited by the researchers (PB and ES) at 2-week intervals during the 12-month study period to check for completeness and ensure adherence to the study protocol.

Information on sociodemographics and behavioral and social characteristics was collected through personal interviews in the ER. These selected variables were reported to be significant risk factors associated with recurrent injuries from physical violence in previous studies [7–10]. In addition, some characteristics, such as the family type of origin and number of family members and number of male siblings, were speculated as being unique risk factors in African men. Sociodemographics consisted of age, height, weight, gender, ethnicity, marital status, family type of origin (monogamous and polygamous), educational level, employment status, household income level, number of households in the compound, number of male and female siblings, number of family members, childhood upbringing, and body-mass index (BMI; kg/m<sup>2</sup>). Behavioral and social characteristics

consisted of social support, risk-taking behaviors, and three lifestyle behaviors of cigarette smoking, alcohol consumption, and illicit drug use in the past week.

Social support was assessed using the 12-item Multi-dimensional Scale of Perceived Social Support (MSPSS) which measures the level of support that an individual perceives from three sources (family, friends, and significant others) [15]. The total score for each source ranges 4–28, with a higher score indicating stronger social support. The MSPSS has excellent internal reliability (alpha coefficients of 0.91–0.94) and validity in a wide range of African settings and cultures [16, 17].

Risk-taking behaviors were assessed by the revised Domain-Specific Risk-Taking Scale (DOSPERT). This 30-item DOSPERT evaluates the likelihood that respondents might engage in behaviors from six domains (ethical, gambling, investing, health/safety, recreational, and social) with a 7-point rating scale for each item [18]. A high score indicates a greater risk-taking level for each of the six domains. The DOSPERT has been used in a wide spectrum of studies examining behavioral risk intentions among different age groups and exhibited good reliability (alpha coefficients of 0.63–0.75) and validity in an African population [19].

## Statistical Analysis

Distributions of sociodemographics and behavioral and social characteristics between cases and the two control groups were compared using Pearson's Chi-squared test for categorical variables and Student's *t* test for continuous variables. In addition, distributions of sociodemographics were also compared between eligible cases who did not participate and those who participated in the study.

A conditional logistic regression model was applied to investigate independent relationships of potential risk factors for recurrent violent injuries in which adjusted odds ratios (ORs) and their 95% confidence intervals (CIs) were computed after adjusting for confounders. For variable selection, variables with a *p* value of  $\leq 0.25$  in the bivariable analysis were identified as potential confounders and included in the initial multivariable analysis to minimize type II errors in selection and biased inferences [20]. During the multivariable analysis, variables with a *p* value of  $< 0.05$  were retained in the final model; furthermore, age and monthly household income were forced into the model to avoid their potential confounding or residual confounding (because age was not perfectly matched), because they are socially important factors in the occurrence of violence [2, 21, 22]. The likelihood ratio and Hosmer–Lemeshow goodness of fit tests were used to evaluate the appropriateness of the model [23]. All analyses were performed using the Statistical Analysis Software (SAS) package (vers. 9.4 for Windows; SAS Institute, Cary, NC, USA).

## Results

During the 12-month study period, of 307 patients who were identified to have recurrent violent injuries from the ERs of the eight health facilities, 257 agreed to participate in the study, of which 162 (63%) had sought treatment for  $\geq 3$  times at an ER for a violent injury. Compared to 50 eligible cases who did not participate in the study, the 257 participating cases were similar in all sociodemographic characteristics. In addition, 257 patients due to violent and nonviolent injuries each were recruited as controls.

Table 1 shows the distributions of sociodemographic characteristics for cases with recurrent violent injuries and the two control groups with injuries due to violence and nonviolence. Between case patients and VCs, significant differences were detected in ethnicity, family of origin, number of households in the compound, number of family members, and childhood upbringing. Between case patients and NCs, significant differences were detected in the family of origin, monthly household income, number of households in the compound, number of male siblings, and childhood upbringing. No significant differences were detected in age, marital status, educational level, employment status, number of female siblings, or BMI between case patients and the two control groups.

Table 2 shows the distributions of behavioral and social characteristics between case patients and the two control groups. Between case patients and VCs, significant differences were detected in cigarette smoking in the past week and perceived family support. Between case patients and NCs, significant differences were detected in alcohol consumption and cigarette smoking in the past week and perceived family and friend social support. No significant differences were detected in illicit drug use in the past week, perceived social support from significant others, or risk-taking behaviors between case patients and the two control groups.

Table 3 shows the results of multivariable conditional logistic regression analyses of risk factors for recurrent violent injuries among Gambian men. When control patients with a violent injury were compared, participants who came from a polygamous family had an increased odds of recurrent violent injuries (OR 3.62; 95% CI 2.00–6.57) compared to those from a monogamous family. Participants who had  $> 8$  family members (OR 5.60; 95% CI 2.81–11.2), had smoked cigarettes in the past week (OR 3.53; 95% CI 2.12–5.88), and perceived no family support (OR 1.12; 95% CI 1.07–1.18), respectively, had an increased odds of recurrent violent injuries compared to their counterparts. Participants who had been brought up by a family relative had an increased odds of recurrent violent injuries (OR 5.17; 95% CI 2.08–12.8) compared to those brought up by both parents.

**Table 1** Comparisons of sociodemographics between case patients with recurrent violent injuries and two control groups with injuries respectively due to violent and nonviolent causes

Characteristic	Cases ( <i>N</i> =257) <i>n</i> (%)	Violence controls ( <i>N</i> =257) <i>n</i> (%)	<i>p</i> value	Nonviolence controls ( <i>N</i> =257) <i>n</i> (%)	<i>p</i> value
Age (years)					
15–24	127 (49.4)	119 (46.3)	0.935	124 (48.3)	0.927
25–34	88 (34.2)	98 (38.1)		94 (36.6)	
35–44	37 (14.4)	35 (13.6)		33 (12.8)	
≥ 45	5 (2.0)	5 (2.0)		6 (2.3)	
Ethnicity					
Mandinka	84 (32.7)	94 (36.6)	0.048	82 (31.9)	0.106
Wolof	49 (19.1)	44 (17.1)		70 (27.2)	
Fula	71 (27.6)	48 (18.7)		54 (21.0)	
Others <sup>a</sup>	53 (20.6)	71 (27.6)		51 (19.8)	
Family of origin					
Monogamous	105 (40.9)	171 (66.5)	<0.001	181 (70.4)	<0.001
Polygamous	152 (59.1)	86 (33.5)		76 (29.6)	
Marital status					
Married	189 (73.5)	188 (74.3)	0.844	176 (69.3)	0.207
Single	68 (26.5)	65 (25.7)		78 (30.7)	
Educational level					
Primary/no education	39 (15.2)	26 (10.5)	0.133	58 (22.7)	0.161
Secondary education	132 (51.6)	148 (59.4)		119 (46.4)	
Tertiary education	85 (33.2)	75 (30.1)		79 (30.9)	
Employment status					
Employed full time	143 (56.5)	121 (49.4)	0.359	136 (52.9)	0.429
Intermittently employed	29 (11.5)	27 (11.0)		39 (15.2)	
Unemployed	11 (4.4)	13 (5.3)		8 (3.1)	
Student	70 (27.7)	84 (34.3)		74 (38.8)	
Monthly household income (< GMD15,000 <sup>c</sup> )	210 (82.0)	195 (75.9)	0.087	165 (66.5)	0.001
Number of households in the compound (≥ 2)	115 (44.8)	70 (27.2)	<0.001	79 (30.7)	<0.001
Number of male siblings (> 2)	172 (66.9)	152 (59.1)	0.066	121 (47.1)	<0.001
Number of female siblings (> 2)	178 (69.3)	167 (65.0)	0.302	195 (75.9)	0.164
Number of family members (> 8)	229 (89.1)	148 (57.6)	<0.001	146 (56.8)	<0.001
Childhood upbringing					
Both parents	188 (73.2)	227 (88.3)	<0.001	225 (88.6)	<0.001
Single parent	17 (6.6)	16 (6.2)		10 (3.9)	
Family relative <sup>b</sup>	52 (20.2)	14 (5.5)		19 (7.5)	
BMI <sup>c</sup> (kg/m <sup>2</sup> ), mean ± SD	24.2 ± 8.6	23.7 ± 5.2	0.413	23.8 ± 6.1	0.600

*BMI* body mass index

<sup>a</sup>Other ethnic groups include the Jola, Serahuli, Manjago, Serer, Aku, and Balanta

<sup>b</sup>Family relatives involved in the upbringing include grandparents, uncles, and aunts

<sup>c</sup>The exchange rate was US\$1.0 ≈ GMD45.0

On the other hand, when control patients with a nonviolent injury were compared, participants who came from a polygamous family had an increased odds of recurrent violent injuries (OR 2.79; 95% CI 1.23–6.33) compared to those from a monogamous family. Participants who had > 8 family members (OR 4.81; 95% CI 2.61–8.84),

had > 2 male siblings (OR 1.84; 95% CI 1.12–3.03), and had a monthly household income of < GMD15,000 (OR 3.11; 95% CI 1.65–5.86), respectively, had an increased odds of recurrent violent injuries compared to their counterparts. Participants who had consumed alcohol in the past week (OR 4.66; 95% CI 1.41–15.4), had smoked

**Table 2** Comparisons of behavioral and social characteristics between case patients with recurrent violent injuries and two control groups with injuries respectively from violent and nonviolent causes

Characteristic	Cases ( <i>N</i> =257)	Violence controls ( <i>N</i> =257)	<i>p</i> -value	Nonviolence controls ( <i>N</i> =257)	<i>p</i> -value
	<i>n</i> (%)	<i>n</i> (%)		<i>n</i> (%)	
Alcohol consumption in the past week	26 (10.1)	19 (7.4)	0.275	8 (3.1)	0.001
Cigarette smoking in the past week	164 (63.8)	82 (31.9)	<0.001	85 (33.1)	<0.001
Use of illicit drugs in the past week	3 (1.2)	4 (1.6)	0.703	2 (0.8)	0.653
Perceived support, mean ± SD					
Family	20.6 ± 5.9	23.2 ± 6.0	<0.001	24.2 ± 4.5	<0.001
Friends	23.7 ± 3.9	23.1 ± 6.3	0.223	24.0 ± 4.5	0.014
Significant others	23.0 ± 3.5	23.1 ± 6.3	0.769	23.7 ± 5.5	0.761
Risk-taking behaviors, mean ± SD					
Social	13.2 ± 4.6	13.3 ± 6.4	0.771	14.6 ± 6.5	0.197
Recreational	8.6 ± 4.6	9.0 ± 5.9	0.516	9.9 ± 7.3	0.553
Health and safety	103 ± 4.3	10.3 ± 7.2	0.953	11.8 ± 6.9	0.886

SD standard deviation

**Table 3** Results of the conditional logistic regression analysis of risk factors with the adjusted odds ratio (OR) and 95% confidence interval (CI) for recurrent violent injuries vs. violence controls and nonviolence controls

Characteristic	Violence controls			Nonviolence controls		
	OR	(95% CI)	<i>p</i> value	OR	(95% CI)	<i>p</i> value
Family origin (polygamous/monogamous)	3.62	(2.00–6.57)	<0.001	2.79	(1.23–6.33)	0.014
Number of family members (> 8/≤ 8)	5.60	(2.81–11.15)	<0.001	4.81	(2.61–8.84)	<0.001
Number of male siblings (> 2/≤ 2)		NA		1.84	(1.12–3.03)	0.016
Monthly household income (< GMD15,000/≥ GMD15,000) <sup>b</sup>	1.77	(0.91–3.45)	0.093	3.11	(1.65–5.86)	0.001
Childhood upbringing						
Both parents	1.00	Ref.		1.00	Ref.	
Single parent	1.84	(0.65–5.21)	0.250	2.55	(0.83–7.84)	0.104
Family relative <sup>a</sup>	5.17	(2.08–12.8)	0.001	2.11	(1.04–4.30)	0.040
Alcohol consumption in the past week (yes/no)		NA		4.66	(1.41–15.4)	0.012
Cigarette smoking in the past week (yes/no)	3.53	(2.12–5.88)	<0.001	4.03	(2.33–6.70)	<0.001
No perceived family support (yes/no)	1.12	(1.07–1.18)	<0.001	1.19	(1.10–1.28)	<0.001

NA not applicable

<sup>a</sup>Family relatives involved in the upbringing include grandparents, uncles, and aunts

<sup>b</sup>The exchange rate was US\$1.00 ≈ GMD45.00

cigarettes in the past week (OR 4.03; 95% CI 2.33–6.70), and perceived no family support (OR 1.19; 95% CI 1.10–1.28), respectively, had an increased odds of recurrent violent injuries compared to their counterparts. Participants who had been brought up by a family relative had an increased odds of recurrent violent injuries (OR 2.11; 95% CI 1.04–4.30) compared to those brought up by both parents.

## Discussion

As a whole, the results of this study indicate that men who lived in a polygamous family, had more family members, had two or more male siblings, had a low household income, had been brought up by a family relative, had consumed alcohol in the past week, had smoked cigarettes

in the past week, and perceived no family support significantly had increased odds of recurrent injuries from physical violence. While lifestyle factors identified in the study, such as alcohol consumption and cigarette smoking, as well as a low household income, childhood upbringing, and no family support, are consistent with those reported in studies in the US [7, 24, 25], some factors, such as a polygamous family and numbers of family members and male siblings, are unique, probably due to family systems in Africa.

The effects of a polygamous family and the number of family members on recurrent violent injuries may partly reflect religious beliefs and the traditional family structure in The Gambia. A traditional family has two or more generations living together in an extended family compound. In the Gambia, about 90% of the population (95% in this study) practice Islam and accept its doctrine of polygamy, which thus results in large family sizes [13]. A large family in African society, particularly with more male children, is considered an economic advantage of having more hands to work on the farm as well as a means of security for the family [26]. Nevertheless, issues of property ownership, land use, and inheritance in polygamous or large families often induce physical confrontations particularly among male siblings who do not share the same biological mother. In addition, in a large extended family compound, it is not uncommon that misunderstandings and conflicts are generated among siblings who share family responsibilities and resources due to limited availability of basic living needs (e.g., food and shelter) which may then escalate into physical confrontations. As for the number of male siblings, it is known that the effect of parents' differential treatment towards their male children may increase the risk of physical confrontations [27]. Specifically, older male siblings may have physically assaulted younger siblings as a means of protection or social control, since physical punishment remains culturally acceptable as a normal method of discipline in African society [11]. Alternatively, those participants who experienced sibling violence might have experienced psychological problems from the event and may be at an increased risk of recurrent violence victimization [28].

Household poverty is a notorious risk factor for recurrent violent victimization among men [29, 30]. Previous studies showed that poverty-related stress can result in some behavioral outcomes, such as involvement in illicit economic activities and weapon carrying, which increase the risk of recurrent violent injury [6]. In The Gambia, men from poor households are regularly confronted with the trials of economic hardship, including difficulties of meeting essential family financial obligations and challenges of living in substandard housing. Stress from these hardships can be worse when men marry more than one wife or live in a family

compound, and as a result, trivial misunderstandings can escalate into physical confrontations and violent injuries.

Upbringing by non-biological parents in high-income countries is associated with problematic behaviors and violent victimization [31]; conversely, good parental monitoring may protect against delinquent behaviors [32]. In The Gambia, when parental care is not available due to parents' work schedule, care by family relatives (e.g., a grandparent, uncle, or aunt) appears to be the most common alternative. However, individuals who are brought up by family relatives may be deprived of intimate parental love and care and may subsequently exhibit violent behaviors [33]. One study found that youths who lived with a family relative had a 16-fold higher risk of being a victim of violence compared to those who lived with their biological parents [34]. More than 76% of family relatives were grandparents in this study. However, grandparents who are old and have chronic health problems [35] would be less likely to have full control over male grandchildren. Studies in the US indicated that men brought up by grandparents were more likely to engage in peer-motivated delinquent behaviors and to have an increased risk of recurrent violence victimization in adult life [36]; on the contrary, parental monitoring may prevent male children from associating with delinquent peers and engaging in risky behaviors [37].

Alcohol consumption is consistently identified as a strong risk factor for recurrent physical violence in men [7, 38], although the magnitude of its effect varies across different countries, depending on drinking patterns and social acceptance of alcohol consumption [39]. Alcohol consumption is associated with aggressive behaviors under provoking tendencies to initiate violence [40]. Group drinking in bars has recently become a routine social activity among young Gambian men which may have created conducive environments for physical confrontations. While there are no legal regulations on alcohol consumption in The Gambia, the availability of cheap or free locally home-brewed alcohol may contribute to violent behaviors among men. In this study, a high proportion (83%) of young men (15–34 years) had smoked cigarettes prior to the occurrence of physical violence. Cigarette smoking might function as an indicator of peer-influenced negative behaviors because it is associated with both delinquent behaviors and recurrent violence victimization among youths [24]. Furthermore, cigarette smoking might predispose men to initiate violence, since smokers are more likely to have antisocial behaviors and increased levels of impulsivity compared to nonsmokers [41].

Positive support from family members can help preserve family identity and cohesion, as well as maintain non-delinquent behaviors in men [42, 43]. Several prospective studies reported that men with high family support were less influenced by delinquent peers and thereby had decreased risk of recurrent violence victimization [25, 44]. Alternatively, this

result partly reflects large family dependencies in The Gambia, so that men who do not benefit from this dependency privilege from family members perceive no family support. Unfortunately, our data do not include sufficient information to identify what type of family support is relevant. Thus, further research is needed to explore the type of family support and related recurrent violence behavioral outcomes.

Findings between the two control groups somewhat differed, even though most of the risk factors identified from the two comparison groups were the same. Use of the VC group identified factors contributing to more-frequent violence rather than those that resulted in an occasional violent event over the study period. In contrast, use of the NC group tended to identify factors that may have contributed to frequent violence and/or an occasional violent event. For example, the two factors of the number of male siblings and alcohol consumption in the past week seemed to be less likely to induce multiple violent injuries over a 1-year period. Nevertheless, empirical evidence on risk factors for the first violent event is needed to support this inference.

There are several limitations to this study. First, the study results cannot be generalized to all men who sought treatment at the ERs due to recurrent violent injuries, since this study focused on male patients from public health facilities in urban and peri-urban areas, and those treated in private health facilities or who live in rural areas might have different characteristics. Second, because the two control groups were recruited from the ERs, their distributions of study exposures, particularly in the NCs, might not have reflected those in the catchment areas where cases came from, such that selection bias might have occurred. Third, potential confounding might still exist in the results due to the lack of measures on social-learning (e.g., a history of childhood abuse or witnessing violence as a child), since these measures are associated with a predisposition to recurrent violence victimization [31]. Finally, although control patients were carefully interviewed to ascertain whether they had complaints or health problems related to recurrent physical violence, the possibility of misclassifying the recurrent violent injury as being the first one may still have occurred, and accordingly the effects of those potential risk factors for recurrent violent injuries might have been underestimated in the study.

Despite these potential limitations, some strengths of the study deserve mention here. This is the first study to investigate recurrent violent injuries in African men, and thus its results may help develop better specific and effective intervention programs for this population. Second, the use of two control groups might have provided a more-valid picture of risk factors for recurrent violent injuries, particularly for those risk factors that were significantly associated with the occurrence of recurrent violent injuries in the two control groups. Finally, exposure data were collected immediately

after an injury by the ER staff and thus may have reduced potential memory lapses and differential measurement errors between case and control patients (e.g., recall bias).

## Conclusions

Several risk factors for recurrent violent injuries, such as a polygamous family, a large family, a family relative bringing up the child, a low household income, recent cigarette smoking, recent alcohol consumption, having more male siblings, and no perceived family support, were identified for men in The Gambia. These findings may fill in a knowledge gap that will be beneficial for developing effective intervention programs specifically to reduce recurrent injuries from physical violence among African men.

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## Compliance with Ethical Standards

**Conflict of interest** The authors declare that they have no conflicts of interest.

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